5.2 AIR QUALITY

This section describes the existing air quality conditions in the MPP area, the maximum potential impacts from the MPP, and the mitigation measures that will be utilized to keep any impacts below thresholds of significance. The MPP will use combined-cycle technology generation and best available control technology (BACT) emission control equipment to minimize both the emissions of criteria pollutants and the potential effects on ambient air quality.

This section also presents the methodology and results of the air quality analyses performed to assess potential impacts associated with air emissions from the construction and operation of the MPP. Potential public health risks posed by emissions of non-criteria pollutants are addressed in Section 5.16 (Public Health).

Existing air quality conditions are described in Section 5.2.2. Applicable regulations are discussed in Section 5.2.3 and consistency with laws, ordinances, regulations, and standards (LORS) is discussed in Section 5.2.3.3. The methodology used in the quantitative air quality analysis and the resulting potential impacts are presented in Section 5.2.4. The protocol for analyzing cumulative air quality impacts is presented in Section 5.2.4.3.3. Measures that mitigate the potential impacts to air quality are discussed in Section 5.2.5. References cited in this section are listed in Section 5.2.6.

5.2.1 Summary of Air Quality Impacts

The City of Burbank (COB) Water and Power Department owns and operates the existing COB Power Generating Facility, located at 164 Magnolia Boulevard, in the City of Burbank, California. The new unit will be located on the existing COB site. Some existing structures at the site will be demolished to make room for the new unit. The MPP involves the construction and operation of a natural gas-fired, combined-cycle power plant with a nominal capacity of 250 MW. Compared to previous technologies, combined-cycle turbine technology is a more efficient way to generate electricity, requiring less fuel than the old boilers to generate the same amount of power. These new combined-cycle turbines produce very low levels of air pollutant emissions, and emissions of oxides of nitrogen (NO_x), volatile organic compounds (VOC), and carbon monoxide (CO) emissions will be controlled to even lower levels using selective catalytic reduction (SCR) and oxidation catalyst technology.

The existing generating units at the project site and their status are listed in Table 5.2-1, below.

TABLE 5.2-1

SUMMARY OF EXISTING FACILITIES

Generating Unit	Unit Type	Rated Capacity (MW)	Historical Usage
Olive 1	Steam	44	Spinning Reserve, Low Utilization
Olive 2	Steam	55	Spinning Reserve, Low Utilization
Olive 3	CT*	23	Low Utilization, Peaking
Olive 4	CT*	32	Low Utilization, Peaking
Magnolia 1	Steam	0	Decommissioned structure, originally 10.5 MW
Magnolia 2	Steam	0	Decommissioned structure, originally 10.5 MW
Magnolia 3	Steam	20	Standby
Magnolia 4	Steam	30	Standby
Magnolia 5	CT	22	Low Utilization, Peaking
Total Net Plant Output		**226**	

* CT = combustion turbine.

The MPP project includes switchyard upgrades to the existing Olive switchyard, construction of a power island, control and administrative buildings, wet mechanical-draft cooling towers, a package boiler, storage tanks, natural gas compressors, and other ancillary facilities. The project also includes onsite pipelines for natural gas supply, water supply and wastewater discharge, site access and parking.

The power island will consist of an F-Class (GE 7FA or Westinghouse 501F) advanced technology combustion turbine (CT), a heat recovery steam generator (HRSG) with supplemental duct burning[1], and a steam turbine generator (STG). The project will be nominally rated at 250 MW.

The CT converts thermal energy produced by the combustion of natural gas into mechanical energy. This mechanical energy is used to drive the electric generator and gas compressor. The CT will be equipped with an inlet air evaporative cooling system to enhance performance on hot days. In order to preheat the pollution control systems prior to start-up, steam will be provided from an auxiliary boiler that will be installed as part of the project.

1 “Duct burning” is synonymous with “duct firing.”

The CT will exhaust into a HRSG. The HRSG design will be a sliding-pressure, supplementary duct-fired, dual-pressure reheat type with horizontal gas flow. Duct firing for peaking power will occur in the HRSG for approximately 1,000 hours per year. The HRSG includes inlet and outlet ductwork, a stack damper and a 150 foot tall exhaust stack.

Heat rejection for the power cycle will be accomplished with a wet mechanical-draft cooling tower, a condenser for the STG, a recirculating water system, and auxiliary cooling water heat exchangers.

NO_x emissions will be controlled by a combination of dry low NO_x combustors and post combustion control. The post combustion control is SCR, a combustion catalyst that oxidizes NO to NO_2 in the presence of ammonia. Emissions of NO_x will be controlled to 2.0 ppmvd at 15 percent O_2 utilizing SCR with and without duct burning. Aqueous ammonia (19% solution) will be stored in a 12,000-gallon tank. The maximum unreacted ammonia “slip” will be 5 ppm at 15 percent O_2.

Good combustion engineering and an oxidizing catalyst will reduce formation of CO. CO emissions will be controlled to 6 ppmvd. The oxidation catalyst will also provide some VOC emission control. Exhaust VOCs will be less than 2 ppm (as methane) without duct burning; with duct burning, VOC emissions will be less than 6 ppm. Sulfur dioxide (SO_2), and particulates less than 10 microns in aerodynamic diameter (PM_{10}) will be reduced by the use of natural gas as the plant's sole fuel source and good combustion practices.

Fuel gas will be supplied to the site through an existing interconnection with interstate pipelines. Natural gas at approximately 230 to 420 psig will be delivered to the site via an existing SoCalGas pipeline to the site. No new pipeline or upgrades to the existing pipeline will be required. Fuel oil will not be used at the site as a backup turbine fuel.

Before the new turbine can be built, the SCPPA needs to receive regulatory approval from two agencies that will review the air quality impacts of the proposed project: The South Coast Air Quality Management District (SCAQMD) and the CEC. Each agency has its own set of standards for review, but the goals of the agencies are the same:

- To ensure that the operation of the new turbines will not cause or contribute to the violation of any health-based ambient air quality standards, and

- To ensure that the emissions of potentially toxic pollutants from the turbines will not cause any health hazards.

Each agency's review assesses several similar issues about the project. The issues are as follows:

- Identification of the existing air quality in the area
- Proposed facility operations
- Determination of the air pollutant emissions from the new project
- Assessment of the BACT to control emissions
- Project mitigation measures for any increase in emissions over existing levels
- Identification of the effect of facility operation on air quality in the area, and
- Assessment of the new project toxic pollutant emissions and potential impacts to the health of the most sensitive members of the community.

To facilitate agency review and provide an overview of air quality issues, this section of the AFC presents a summary of these issues. The summary refers the reader to specific sections of the AFC to find more information about each topic. Finally, the sections of the AFC refer the reader to appendices that contain the detailed calculations that support each conclusion.

5.2.1.1 Identification of Existing Air Quality in the Area

The U.S. Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS) for ozone, NO_2, CO, SO_2, and PM_{10}. Areas with air pollution levels above these standards can be considered "non-attainment areas" subject to planning and pollution control requirements that are more stringent than standard requirements.

In addition, the California Air Resources Board (CARB) has established standards for ozone, CO, NO_2, SO_2, sulfates, PM_{10}, airborne lead, hydrogen sulfide, and vinyl chloride, at levels designed to protect the most sensitive members of the population - particularly children, the elderly, and people who suffer from lung or heart diseases.

Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and, in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (1-hour, for instance) or to a relatively lower average concentration over a longer period (8-hours, 24 hours, or 1-month). For some pollutants there is more than one air quality standard, reflecting both their short-term and long-term effects. The California standards are generally set at concentrations much lower than the federal standards, and in some cases have shorter averaging periods.

Air quality in the SCAQMD is in attainment with the federal and state standards for SO_2 and NO_2. Ozone levels in the SCAQMD are above the standards, and as a result, the SCAQMD is considered non-attainment for ozone. In addition, the SCAQMD is considered non-attainment for both the federal and state PM_{10} and CO standards.

In accordance with CEC regulations, the ambient concentrations of all criteria pollutants for the previous three years as measured at three CARB-certified monitoring stations located closest to the MPP site were used to characterize the ambient air quality at or near the MPP site. In some cases, data from a ten-year period is reported so that trends in air quality can be seen. Due to proximity to the MPP site, the period of data collection, and the quality of data reporting, the data from all three sites in combination is considered to be representative of the ambient air quality conditions at the MPP site.

The Burbank-West Palm Avenue (Burbank) ambient air monitoring station was used to characterize air quality near the project site. This station was used because of its proximity to the MPP site (it is located less than one-half mile to the southwest of the MPP site), and because it records area-wide ambient conditions rather than the localized impacts of any particular facility. Ambient concentrations of ozone, CO, NO_2, SO_2, PM_{10}, and toxics (specifically lead) are monitored at the Burbank monitoring station. Table 5.2-2 summarizes the ambient concentrations of air pollutants that were measured at the Burbank monitoring station between 1997 and 1999, and compares them with the federal and state ambient air quality standards.

In addition to ambient data from the Burbank monitoring station, data from the Los Angeles – North Main Boulevard (Los Angeles) and the Pasadena – South Wilson Avenue (Pasadena) ambient monitoring stations were used to assist in the characterization of regional air quality near the site. These stations were used due to their proximity to the site (the Los Angeles – North Main Boulevard station is located approximately 9 miles to the southeast of the MPP site; the Pasadena – South Wilson Boulevard station is located approximately 11 miles to the southeast of the MPP site). Tables 5.2-3 and 5.2-4 show the ambient concentrations of air pollutants measured at these monitoring stations between 1997 and 1999, and compares them with the federal and state ambient air quality standards.

TABLE 5.2-2

MAXIMUM BACKGROUND CONCENTRATIONS BURBANK – WEST PALM AVENUE, 1997-1999 (μg/m³)

Pollutant	Averaging Time	Maximum Monitored Concentrations 1997	1998	1999	Air Quality Standard State	Federal
Ozone[1]	1-hour	0.134	0.177	0.120	0.09	0.12
NO_2	1-hour	376	269	337	470	n/a
	Annual	79	77	85	n/a	100
CO	1-hour	10,032	9,234	10,488	23,000	40,000
	8-hour	8,276	8,356	10,180	10,000	10,000
SO_2	1-hour	91	26	23	650	n/a
	24-hour	13	18	8	105	365
	Annual	5	3	0	n/a	80
PM_{10}	24-hour	92	75	82	50	150
	AGM[2]	42	33	41	30	n/a
	AAM[3]	45	36	44	n/a	50

[1] Ozone concentration expressed in parts per million (ppm).
[2] Annual geometric mean. The state annual average is a geometric mean of all measurements.
[3] Annual arithmetic mean. The national annual average is an arithmetic average of the four arithmetic quarterly averages.

TABLE 5.2-3

MAXIMUM BACKGROUND CONCENTRATIONS LOS ANGELES – NORTH MAIN BOULEVARD, 1997-1999 (μg/m³)

Pollutant	Averaging Time	Maximum Monitored Concentrations 1997	1998	1999	Air Quality Standard State	Federal
Ozone[1]	1-hour	0.120	0.148	0.128	0.09	0.12
NO_2	1-hour	372	320	399	470	n/a
	Annual	81	73	73	n/a	100
CO	1-hour	10,146	9,348	8,208	23,000	40,000
	8-hour	8,892	7,045	7,262	10,000	10,000
SO_2	1-hour	52	235	138	650	n/a
	24-hour	29	16	26	105	365
	Annual	5	3	8	n/a	80
PM_{10}	24-hour	102	80	88	50	150
	AGM[2]	39	35	42	30	n/a
	AAM[3]	42	38	45	n/a	50

[1] Ozone concentration expressed in ppm.
[2] Annual geometric mean. The state annual average is a geometric mean of all measurements.
[3] Annual arithmetic mean. The national annual average is an arithmetic average of the four arithmetic quarterly averages.

TABLE 5.2-4

MAXIMUM BACKGROUND CONCENTRATIONS
PASADENA – SOUTH WILSON AVENUE, 1997-1999 ($\mu g/m^3$)

Pollutant	Averaging Time	Maximum Monitored Concentrations			Air Quality Standard	
		1997	1998	1999	State	Federal
Ozone[1]	1-hour	0.142	0.171	0.120	0.09	0.12
NO_2	1-hour	321	312	288	470	n/a
	Annual	64	66	70	n/a	100
CO	1-hour	9,234	9,576	9,918	23,000	40,000
	8-hour	6,829	7,182	7,501	10,000	10,000
SO_2	1-hour	Not measured at this site			650	n/a
	24-hour				105	365
	Annual				n/a	80
PM_{10}	24-hour	Not measured at this site			50	150
	AGM[2]				30	n/a
	AAM[3]				n/a	50

1 Ozone concentration expressed in ppm.
2 Annual geometric mean. The state annual average is a geometric mean of all measurements.
3 Annual arithmetic mean. The national annual average is an arithmetic average of the four arithmetic quarterly averages.

The locations of the three selected monitoring stations relative to the proposed project site are such that emissions measurements recorded at the monitoring stations are believed to represent area-wide ambient conditions rather than the localized impacts of any particular facility.

At the Burbank station the levels of ozone measured in 1997, 1998 and in 1999 exceeded the state 1-hour air quality standard. The federal air quality standard was exceeded in 1997 and 1998 in the same three year period. The levels of NO_2 measured during the period 1997 through 1999 did not exceed the state 1-hour standard or the federal annual standard.

One-hour CO levels were well within the state and federal standards for the same period; in 1997 and 1998 the CO levels were within the federal 8-hour CO standard; however this standard was exceeded in 1999. The 8-hour levels measured during this period showed an overall increase.

SO_2 levels at the Burbank station were well within the state 1-hour standard, the state and federal 24-hour standard, and the federal annual standard. SO_2 levels showed significant decreases over the period 1997 through 1999 (77%, 38% and 100% for the 1-hour, 24-hour, and annual air quality standards, respectively).

PM_{10} levels in all three years exceeded the state 24-hour standard, but not the federal 24-hour standard. There was no significant change in the overall state or federal annual average level measured at the Burbank station. The state annual average was also exceeded in all three years; however the federal annual average standard was not exceeded in the years 1997 through 1999.

Table 5.2-3 shows the maximum background concentrations of criteria pollutants measured at the Los Angeles monitoring station for the period 1997 through 1999.

At the Los Angeles monitoring station, the 1-hour levels of ozone measured in 1997, 1998 and 1999 exceeded the state 1-hour standard. The federal 1-hour ozone standard was reached in 1997 and exceeded in 1998 and 1999. Levels of NO_2 were within the state 1-hour standard and within the federal annual standard for all three years. The annual NO_2 levels decreased by almost 10 percent.

Levels of CO were within the state and federal 1-hour standards, and within the state and federal 8-hour standard for the years 1997 through 1999. The hourly maximum levels of CO measured at this station decreased over the three-year period. There were no violations of the state and federal 1-hour, 24-hour, or annual SO_2 standards for these years.

The levels of PM_{10} measured at the Los Angeles station for the years 1997 through 1999 exceeded the state but not the federal 24-hour PM_{10} standard. The 24-hour average levels decreased by approximately 14 percent over the three-year period. However, the state annual average and the federal annual average levels increased (approximately 7% and 6% respectively) over this period of time. The state annual average was also exceeded for all three years, and the federal annual average of 50 $\mu g/m^3$ was approached but not exceeded.

Table 5.2-4 shows the maximum background concentrations of criteria pollutants measured at the Pasadena monitoring station for the years 1997 through 1999.

As at the Burbank and the Los Angeles station, the levels of ozone measured in 1997, 1998, and 1999 exceeded the state 1-hour standard. The federal 1-hour ozone standard of 0.120 ppm was exceeded in 1997 and in 1998, and was reached in 1999.

The levels of NO_2 measured at the Pasadena station were well within both the state 1-hour and the federal annual standards. The 1-hour levels showed a decline over the three-year period, while the annual levels showed a slight increase.

The 1-hour CO levels and the 8-hour CO levels at this station were also well within the respective state and federal air quality standards. The 8-hour levels increased around nine percent from 1997 to 1999. SO_2 and PM_{10} are not monitored at the Pasadena ambient monitoring station.

5.2.1.2 Proposed Facility Operations

The turbine may operate under a base load operating scenario (continuous operations) or a load following scenario (frequent startup/shutdown operations) depending upon the electricity market and demand. SCAPPA expects that the new turbine will operate at a 95 percent capacity factor (8,322 hours per year base load operations). Up to 104 startups and shutdowns may occur under load following operations. The turbine and the associated HRSG are equipped with a duct burner that adds heat to the STG. This allows the STG to generate more steam for the steam turbine, so that when demand for electricity is high, the STG/HRSG can produce more electricity. SCAPPA anticipates that the duct burner may operate up to 12 hours each day and approximately 1,000 hours each year.

An auxiliary boiler may also be used to heat steam for the steam turbine. It is anticipated that the auxiliary boiler may be used for no more than 156 hours per year.

5.2.1.3 <u>Determination of the Air Pollutant Emissions from the New Project</u>

The proposed project will consist of one F-Class, natural gas fired CT operating in a combined cycle mode. The CT will exhaust to a new HRSG and stack. The primary emissions are expected to be NO_x, CO, VOC, PM_{10}, and SO_2. Turbine emissions of NO_x will be controlled using an SCR system and dry low-NO_x combustors. Emissions of CO and VOC will be controlled using an oxidation catalyst. While the CT will be the major operational emissions source, the project will also include a cooling tower and an auxiliary boiler. The cooling tower particulate emissions will be controlled using a high-efficiency drift eliminator.

The applicant is currently evaluating two CT vendors (Westinghouse 501F and GE 7FA), and a final selection is not expected prior to filing the AFC. Both potential vendors have been considered in the emissions scenario presented herein.

Potential air pollutant emissions from the new turbine were calculated using proposed emissions scenarios during the load following and base load operating modes. The highest resulting emissions on a pollutant basis are proposed as the project emission limits. PM_{10} and SO_x are highest under a base load scenario. VOCs, NO_x, and CO are highest under a load following scenario. Emissions and fuel use will be monitored continuously to ensure that the CT and duct burner are always in compliance with the permit limits. Table 5.2-5 shows the proposed highest allowable hourly, daily, and annual emissions from the new CT and duct burner. Detailed calculations are contained in Section 5.2.4.2.

TABLE 5.2-5

EMISSIONS FROM COMBUSTION TURBINE

	NO_x	SO_2	CO	VOC	PM_{10}
Maximum Hourly Emissions, lb/hr[1]	18.1	1.5	30.9	17.74	18.0
Maximum Daily Emissions, lb/day[2]	396	31.1	1,045	273	360
Maximum Annual Emissions, tpy[3]	61.0	4.89	123.5	21.1	53.1

[1] Maximum hourly emissions are based on maximum non-startup mass emission rate of either the GE or Westinghouse turbine alternatives.
[2] Maximum daily emissions of NO_x, CO, and VOCs are based on 1 startup, 12 hours of operation of duct burning, and the remaining hours of operation at the maximum non-duct burning mass emission rate. Maximum daily emissions of PM_{10} and SO_2 do not include the effects of startups.
[3] Annual emissions for all pollutants are based on 52 hot starts, 52 warm starts, 104 shutdowns, 1,000 hours of duct burning, and 7,083 hours of operation at the maximum non-duct burning mass emission rate.

5.2.1.4 Assessment of Best Available Control Technology to Control Emissions

The project is required to use BACT to control its air emissions. The applicant has reviewed permit requirements approved by the EPA, the CARB, and the CEC staff and believe that the following emissions limits reflect the best available controls:

NO_x: 2.0 parts per million by volume, dry (ppmvd), corrected to 15 percent O_2

SO_2: Use of natural gas fuel with a sulfur content not to exceed 0.21 grains per 100 standard cubic feet

CO: 6 ppmvd, corrected to 15 percent O_2

VOC: Less than 2 ppmvd, at actual percent O_2; 6 ppmv with duct burning

PM_{10}: 12 pounds per hour without duct burning; 18 pounds per hour with duct burning

Ammonia: 5 ppmvd at 15 percent O_2.

A detailed discussion of control technology options can be found in Section 5.2.4.2.7.

5.2.1.5 Project Mitigation Measures for Emissions Over Existing Levels

The SCAPPA is required to provide offsets for any increase in emissions that will result from the operation of the new turbine. The SCAPPA will also purchase emission credits from several emission reduction credit (ERC) owners within the SCAQMD. SCAQMD regulations allow the use of interpollutant offsets in situations where one pollutant is a precursor to another. For example, since NO_x and SO_x contribute to the formation of PM_{10}, the SCAPPA could use extra NO_x and SO_x ERCs to offset some of its PM_{10} increases. Offsets are discussed in detail in Section 5.2.3.3.

5.2.1.6 Identification of the Effect of Operations on Air Quality in the Area

Federal and SCAQMD regulations and CEC requirements necessitate an analysis of the project on ambient air quality to ensure that the project will not cause or contribute to the violation of any state or federal ambient air quality standards and increments. Air quality impacts are evaluated using EPA-approved atmospheric dispersion computer models that use worst-case emission rates, exhaust stack parameters (including stack heights, exhaust flow rates, and exhaust temperatures), and local meteorology to simulate the dispersion of emissions and to determine the maximum ground level impacts. These models account for the effects of nearby buildings and local terrain. The modeling analysis for the project is based on one year of SCAQMD-approved meteorological data collected at the nearby Burbank Meteorological Station located approximately 1 kilometer northeast of the MPP site, to ensure that impacts are evaluated under the most extreme conditions.

Start-up was used as the worst-case 1-hour average operating scenario, because during start-up conditions, emissions of CO and NO_2 are higher than under normal operating conditions. In addition, flow-rates during start-up are lower resulting in decreased dispersion. Therefore, hourly ambient concentrations of CO and NO_2 were estimated assuming start-up operating conditions. (GE gas turbine exhaust parameters for minimum operating load point [45%] were used to characterize turbine exhaust.)

The 8-hour CO refined modeling scenario assumed a hot start-up for 1.5 hours and duct burning for the remaining 6.5 hours. Stack parameters were based on the Westinghouse turbine.

The 1-hour SO_2 refined modeling scenario was based on duct burning conditions and Westinghouse exhaust parameters. The 24-hour SO_2 refined modeling case was based on 12 hours of operation with duct burning and 12 hours of operation without duct burning. The annual SO scenario was based on 1,000 hours of duct burning, 52 hot starts, 52 warm starts, 104 shutdowns and 7,083 hours of operation at full load with no duct burning.

The 24-hour and annual average PM_{10} modeling scenarios included analysis of both GE and Westinghouse turbines, including operation with and without duct burning (at 100% load).

The NO_2 annual modeling scenario was based on 1,000 hours of duct burning 52 hot starts, 52 warm starts, 104 shutdowns and 7,083 hours of operation at full load with no duct burning.

A summary of project impacts is shown in Table 5.2-6. The table includes concentrations for operations of the proposed project sources (turbine, auxiliary boiler, and cooling tower).

TABLE 5.2-6

SUMMARY OF MODELING RESULTS

Pollutant	Averaging Time	ISCST3	Fumigation	Startup
NO_x	1-hour	19.97	5.124	
	Annual	0.27		--
SO_2	1-hour	1.00	0.3369	
	3-hour	0.97	--	
	24-hour	0.20	--	--
	Annual	0.021	--	--
CO	1-hour	247.51	63.49	
	8-hour	30.65	--	--
PM_{10}	24-hour	2.42	--	--
	Annual	0.25	--	--

Concentrations under fumigation conditions are also summarized in Table 5.2-6. Fumigation occurs when a stable layer of air lies a short distance above the release point of a plume and unstable air lies below. Under these conditions, an exhaust plume may be drawn to the ground with little diffusion, causing high ground level pollutant concentrations. Although fumigation conditions rarely last as long as one hour, relatively high ground level concentrations may be reached during that time.

The highest modeled turbine impacts under these conditions were added to the highest background concentration to demonstrate that the combination of the new project combined with existing background pollutant concentrations will result in compliance with air quality standards. This is shown in Table 5.2-7. The highest background concentration was determined by taking the highest concentration measured at the Burbank air quality monitoring station during the past three years.

The ambient air quality analysis and the data used to represent background concentrations are discussed in detail in Section 5.2.4. Because maximum concentrations occur in Burbank, these data are considered to be representative.

TABLE 5.2-7

MODELED MAXIMUM PROJECT IMPACTS

Pollutant	Averaging Time	Maximum Project Impact (μg/m³)	Background Concentrations[3] (μg/m³)	Total Impact (μg/m³)	State Standard (μg/m³)	Federal Standard (μg/m³)
NO_2	1-hour	19.97	376	395.97	470	--
	Annual	0.27	85	85.27	--	100
SO_2	1-hour	1.00	91	92	650	--
	24-hour	0.20	18.33	18.53	109	365
	Annual	0.04	5.24	5.28	--	80
CO	1-hour	247.51	10,488	10,735.51	23,000	40,000
	8-hour	30.65	10,180	10,210.65	10,000	10,000
PM_{10}	24-hour	2.42	92	94.42	50	150
	AGM[1]	0.25	42	42.25	30	--
	AAM[2]	0.25	45	45.25	--	50

[1] Annual Geometric Mean
[2] Annual Arithmetic Mean
[3] The highest background concentration was determined by ranking the highest concentrations measured at the Burbank, Los Angeles, and Pasadena air quality monitoring stations during the past three years.

5.2.1.7 Assessment of the Project Toxic Pollutant Emissions and Potential Impacts to the Health of the Most Sensitive Members of the Community

SCAQMD Rule 1401, Toxics New Source Review, and CEC licensing procedures require an assessment of the potential impacts of the project on public health, and a demonstration that the emissions of potentially toxic substances from the project will not pose a health hazard to the most sensitive members of the community. This demonstration was made using a screening health risk assessment. In a screening health risk assessment, the short-term (acute), long-term (chronic), and carcinogenic impacts of exposures to potentially toxic substances are compared with generally accepted risk criteria to show whether the project is safe. The screening health risk assessment is carried out in three steps:

- Estimation of emissions of toxic or non-criteria pollutants from each source.
- Use of dispersion modeling to calculate the ground level concentration of each pollutant.
- Use of scientifically derived cancer unit risk factors and acute and chronic reference exposure levels (levels below which no harmful effects are observed) to evaluate carcinogenic risk and chronic and acute non-cancer health hazards.

A screening health risk assessment was performed for the proposed turbine. Toxic emissions were calculated using CARB-approved emission factors and emissions measurements. The dispersion modeling used the same EPA-approved models and meteorological data that were used in modeling criteria pollutant impacts.

The results of the screening health risk assessment are compared with the limits of SCAQMD Rule 1401 in Table 5.2-8.

TABLE 5.2-8

HEALTH RISK ASSESSMENT RESULTS

	New & Existing Equipment	Significance Threshold
Cancer Risk to Maximally Exposed Individual (w/o TBACT)[1]	0.37 in one million	1 in one million
Acute Non-cancer Hazard Index	0.0815	1
Chronic Non-cancer Hazard Index	0.0229	1

[1] TBACT = Toxics – Best Available Control Technology.

The screening health risk assessment is discussed in detail in Section 5.16 (Public Health).

5.2.2 Affected Environment

5.2.2.1 Geography and Topography

As shown on Figure 3.2-1 (site location map), the proposed project is located in the Coastal Region of the SCAQMD. The UTM coordinates of the site are approximately 378,948 meters Easting and 3,782,578 meters Northing (NAD 27). The site is located in the COB, and the nominal site elevation is approximately 560 feet above mean sea level. The area immediately surrounding the MPP site encompasses a mix of industrial and commercial business land uses. Land uses in the vicinity of the MPP site include industrial use to the north, mass transportation and railroad to the east, additional power facilities to the south, and industrial and commercial uses to the west. Elevated terrain lies to the south, north, and northeast. The closest elevated terrain to the project is to the northeast. Terrain elevations rise to the proposed stack top height at a distance of 1.3 km from the MPP site.

5.2.2.2 Climate and Meteorology

Climate. In general, California is dominated by a semi-permanent, subtropical Pacific high-pressure system. Typically mild, the climate is tempered by cool sea breezes. The mild climate may be interrupted by periods of extremely hot weather, however, during the summer and early fall months.

The distinctive climate of the South Coast Air Basin (Basin) is determined by its terrain and geographical location. The Basin is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean in the southwest quadrant with high mountains forming the remainder of the perimeter. The general region lies in the semi-permanent high pressure zone of the eastern Pacific. As a result, the climate is mild, with cool sea breezes. This usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds.

The local climate of the MPP area is determined primarily by proximity to the Verdugo Mountains, which are located less than two miles to the north of the MPP site.

Temperature and rainfall data (30-year normals for the period 1961 through 1990) from the Burbank Valley Pumping Plant meteorological station were used to characterize the local climate in the COB. The Burbank Valley Pumping Plant station is located less than two miles to the north west of the MPP site, near the Burbank Airport. At the Burbank Valley station, the overall minimum and maximum temperatures ever reported were 27° F (in 1949), and 110° F (in 1963), respectively. The normalized maximum temperature recorded at this station was 78 °F; the normalized minimum temperature was 50.9° F. The median temperature was 64.3° F. The area receives most of its rainfall between November and March; the annual average at the Burbank Valley Pumping Station for the data period was 14.24 inches.

The dominant regional wind pattern in the Los Angeles basin is generally characterized by a daytime onshore breeze and a nighttime offshore breeze, which is broken frequently by passing storms or frontal systems. Santa Ana flows, occurring primarily during the period September through March, alter the general pattern. Overall, the basin experiences light average wind speeds with little seasonal variation. Generally, these low wind speeds contribute to the atmosphere's limited capability to disperse air contaminants horizontally within the basin. Additionally, the basin is characterized by frequent strong, elevated inversions. These inversions, created by atmospheric subsidence, severely limit vertical mixing, especially in the late morning and early afternoon periods, and allow the buildup of air pollutants by restricting their movement out of the basin.

Wind and mixing height are two key meteorological parameters that govern the potential for air pollution problems. The predominant winds in California are shown on Figures 5.2-1 through 5.2-4 (Bell, 1958). As the figures indicate, winds in California are generally light and easterly in the winter, but strong and westerly in the spring, summer, and fall.

Wind patterns for Burbank are presented on Figure 5.2-5. The wind rose is based on meteorological data from the Burbank Meteorological Station for the year 1981. Quarterly wind roses and joint frequency distribution tables are presented in Appendix H.1. The Burbank meteorological data shows winds from the southeast and east-southeast approximately 15 percent of the time and from the south around 10 percent of the time.

5.2.2.3 Existing Air Quality and Overview of Standards and Health Effects

In general, the federal Clean Air Act (CAA) requires that NAAQS be exceeded no more than once each year. The EPA has set standards for ozone, NO_2, CO, SO_2, PM_{10}, 2.5-micron particulate matter ($PM_{2.5}$), and airborne lead. Except as described below for the new ozone and $PM_{2.5}$ standards, an area where NAAQS are exceeded more than three times in three years can be considered a non-attainment area subject to planning and pollution control requirements that are more stringent than normal requirements. As discussed below, a federal appeals court remanded both the new ozone and the new $PM_{2.5}$ ambient standards to the EPA. Therefore, the new standards will not be in effect until this lawsuit is settled.

California-state ambient air quality standards are goals set by the CARB to protect public health and welfare. Standards have been set for ozone, CO, NO_2, SO_2, sulfates, PM_{10}, airborne lead, hydrogen sulfide, and vinyl chloride at levels designed to protect the most sensitive members of the population: children, the elderly, and people who suffer from lung or heart diseases. The CARB carries out control program oversight activities, while local air pollution control districts have primary responsibility for air quality planning and enforcement.

Both state and national air quality standards consist of two parts: an allowable concentration of a pollutant and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation, and, in some cases, damage to paint and other materials. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (1 hour, for instance), or to a relatively lower average concentration over a longer period (8 hours, 24 hours, or 1 year). For some pollutants there is more than one air quality standard, reflecting both its short-term and long-term effects. Table 5.2-9 presents the state and national ambient air quality standards for selected pollutants.

TABLE 5.2-9

AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Ozone	1 hour	0.09 ppm	0.12 ppm
	8 hours	-	0.08 ppm (3-year average of annual 4th-highest daily maximum)
Carbon Monoxide	8 hours	9 ppm	9 ppm
	1 hour	20 ppm	35 ppm
Nitrogen Dioxide	Annual Average	-	0.053 ppm
	1 hour	0.25 ppm	-
Sulfur Dioxide	Annual Average	-	0.03 ppm
	24 hours	0.04 ppm	0.14 ppm
	3 hours	-	0.5 ppm
	1 hour	0.25 ppm	-
Suspended Particulate Matter (10 Micron)	Annual Geometric Mean	30 $\mu g/m^3$	-
	24 hours	50 $\mu g/m^3$	150 $\mu g/m^3$
	Annual Arithmetic Mean	-	50 $\mu g/m^3$
Suspended Particulate Matter (2.5 Micron)	Annual Arithmetic Mean	-	15 $\mu g/m^3$ (3-year average)
	24 hours	-	65 $\mu g/m^3$ (3-year average of 98th percentiles)
Particulate Sulfates (TSP Sulfates)	24 hours	25 $\mu g/m^3$	-
Lead	30 days	1.5 $\mu g/m^3$	-
	Calendar Quarter	-	1.5 $\mu g/m^3$

In July 1997, the EPA issued a new NAAQS for ozone, which became effective on September 16, 1997. For ozone, the previous 1-hour standard of 0.12 ppm was replaced by an 8-hour average standard at a level of 0.08 ppm. Compliance with this standard was to be based on the 3-year average of the annual fourth-highest daily maximum 8-hour average concentration measured at each monitor within an area.

At the same time (July 1997), the EPA revised the PM_{10} NAAQS and issued a new NAAQS for $PM_{2.5}$. The NAAQS for particulates was revised in several respects. First, compliance with the current 24-hour PM_{10} standard was to be based on the 99th percentile of 24-hour concentrations at each monitor within an area. Secondly, two new $PM_{2.5}$ standards were added: A standard of 15 $\mu g/m^3$, based on the 3-year average of annual arithmetic means from single or multiple monitors (as available); and a standard of 65 $\mu g/m^3$, based on the 3-year average of the 98th percentile of 24-hour average concentrations at each monitor within an area.

A federal appeals court, however, in May 1999 remanded both the new ozone and the new particulate ambient standards to the EPA for failing to articulate adequately its authority to set the standards. The EPA has filed a petition for a re-hearing with the federal D.C. Circuit Court of Appeals. Implementation of the new standards will be delayed until this lawsuit is settled.

5.2.2.4 <u>Criteria Pollutants and Air Quality Trends</u>

As previously mentioned, ambient air quality data from the three monitoring stations closest to the MPP site were used to characterize air quality in the surrounding area. All of the monitoring stations are operated by the SCAQMD. The Burbank ambient air monitoring station is the closest station to the MPP site, and most closely represents ambient air quality in the project area. This station is located less than one-half mile to the west of the MPP site. Ambient concentrations of ozone, NO_2, PM_{10}, SO_2, lead (Pb), and CO are recorded at this station. The next closest station is the Los Angeles monitoring station, which is located approximately nine miles to the southeast of the project site. Ambient concentrations of ozone, NO_2, PM_{10}, SO_2, total suspended particulate (TSP) sulfates, Pb, and CO are recorded at this station. These two stations provide the most useful ambient air quality data due to their proximity to the MPP site, and due to the array of pollutants measured at the stations.

Ambient air quality data from a third monitoring station was used to support the information drawn from the two closest stations. The third station was the Pasadena monitoring station, located approximately 11 miles to the southeast of the project site. Ambient concentrations of ozone, NO_2, CO, and TSP sulfates are recorded at this station.

The locations of the monitoring stations relative to the proposed MPP are such that emissions measurements recorded at the monitoring stations are believed to represent area-wide ambient conditions, rather than the localized impacts of any particular facility.

5.2.2.4.1 <u>Ozone</u>. Ozone is an end product of complex reactions between VOCs and NO_x in the presence of intense ultraviolet radiation. VOCs and NO_x emissions from millions of vehicles and stationary sources, in combination with daytime wind flow patterns, mountain barriers, a persistent temperature inversion, and intense sunlight, result in high ozone concentrations. For purposes of state and federal air quality planning, the South Coast Air Basin is a non-attainment area for ozone.

Maximum ozone concentrations at the Burbank monitoring station are usually recorded during the summer months. Table 5.2-10 shows the annual maximum hourly ozone levels recorded at the Burbank monitoring station during the period 1990 to 1999, as well as the number of days in which the state and federal standards were exceeded. The data show that during the past 10 years, exceedences of the state ozone air quality standard at this station have been declining, and during the past 3 years the standard is typically exceeded about 20 days per year. Exceedences of the federal standard occur at a lower rate than the state standard exceedences, and have also decreased over the past 10 years. Over the past 3 years the federal standard has been exceeded on average about three days per year.

TABLE 5.2-10

OZONE LEVELS AT THE BURBANK – WEST PALM AVENUE MONITORING STATION, 1990-1999 (ppm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Highest 1-Hour Average	0.200	0.220	0.220	0.180	0.167	0.165	0.142	0.134	0.177	0.120
Number of Days Exceeding:										
State Standard (0.09 ppm, 1-hour)	95	101	115	45	56	58	31	15	33	13
Federal Standard (0.12 ppm, 1-hour)	40	55	47	16	18	20	6	2	7	0

Source: California Air Quality Data, Annual Summary, CARB.

Table 5.2-11 shows the highest one hour average ozone levels recorded at the Los Angeles monitoring station, and the number of days per year that the state and federal standards were exceeded.

TABLE 5.2-11

OZONE LEVELS AT THE LOS ANGELES - NORTH MAIN STREET MONITORING STATION, 1990-1999 (ppm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Highest 1-Hour Average	0.200	0.190	0.200	0.160	0.193	0.167	0.144	0.120	0.148	0.128
Number of Days Exceeding:										
State Standard (0.09 ppm, 1-hour)	70	59	57	34	49	38	24	6	17	13
Federal Standard (0.12 ppm, 1-hour)	32	23	23	8	14	5	4	0	5	1

Source: California Air Quality Data, Annual Summary, CARB.

As with the levels of ozone recorded at the Burbank monitoring station, the levels of ozone at the Los Angeles station have decreased over the ten-year period. The number of times that the state and federal standards have been exceeded has decreased dramatically over the ten-year period.

Table 5.2-12 shows the levels of ozone recorded at the Pasadena monitoring station for the years 1990 through 1999. The number of times that the state and federal standards have been exceeded is also shown. Similar patterns in terms of a decrease in the highest 1- hour average as well as a decrease in the number of exceedences of the state and federal standards over the ten year period occur at the Pasadena station. No exceedences of the federal standard occurred in 1999.

TABLE 5.2-12

OZONE LEVELS AT THE PASADENA - SOUTH WILSON AVENUE MONITORING STATION, 1990-1999 (ppm)

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Highest 1-Hour Average	0.260	0.230	0.270	0.220	0.259	0.205	0.165	0.142	0.171	0.120
Number of Days Exceeding:										
State Standard (0.09 ppm, 1-hour)	118	112	128	92	106	88	54	24	31	15
Federal Standard (0.12 ppm, 1-hour)	69	70	71	53	61	44	17	5	14	0

Source: California Air Quality Data, Annual Summary, CARB.

5.2.2.4.2 <u>Nitrogen Dioxide</u>. NO_2 is formed primarily from reactions in the atmosphere between NO and oxygen or ozone. NO is formed during high-temperature combustion processes, when the nitrogen and oxygen in the combustion air combine. Although NO is much less harmful than NO_2, it can be converted to NO_2 in the atmosphere within a matter of hours, or even minutes, under certain conditions. For purposes of state and federal air quality planning, the South Coast Air Basin is in attainment for NO_2.

Table 5.2-13 shows the maximum one-hour NO_2 levels recorded at the Burbank station each year from 1990 through 1999, as well as the annual average level for each of those years. During this period, there were no violations of the NAAQS of 0.053 ppm annual average (excluding 1996 for which data was not available). There were only two violations of the state 1-hour standard, both occurring in 1991.

TABLE 5.2-13

NITROGEN DIOXIDE LEVELS AT THE BURBANK - WEST PALM AVENUE MONITORING STATION, 1990-1999 (ppm)

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Highest 1-hour Average	0.230	0.290	0.190	0.170	0.184	0.187	0.197	0.200	0.143	0.179
Annual Average (NAAQS = 0.053 ppm)	0.048	0.047	0.050	0.044	0.05	0.045	No data	0.042	0.041	0.045
Number of Days Exceeding:										
State Standard (0.25 ppm, 1-hour)	0	2	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, CARB.

Table 5.2-14 shows the levels of NO_2 recorded at the Los Angeles monitoring station for the period 1990 through 1999.

The levels of NO_2 measured at the Los Angeles monitoring station have ultimately decreased during the period 1990 to 1999; however, in 1991 and 1992 the highest 1-hour average values increased, as did the number of days that the state standard was exceeded. No exceedences of the state standard occurred during the period 1993 through 1999.

TABLE 5.2-14

NITROGEN DIOXIDE LEVELS AT THE LOS ANGELES - NORTH MAIN STREET MONITORING STATION 1990-1999 (ppm)

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Highest 1-hour Average	0.280	0.380	0.300	0.210	0.218	0.239	0.243	0.198	0.170	0.212
Annual Average (NAAQS = 0.053 ppm)	0.047	0.049	0.040	0.034	0.047	0.045	No data	0.043	0.039	0.039
Number of Days Exceeding:										
State Standard (0.25 ppm, 1-hour)	3	4	1	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, CARB.

Table 5.2-15 shows that the levels of NO_2 at the Pasadena monitoring station experienced similar trends to the Burbank and Los Angeles stations for the period 1990 through 1999. The only exceedences of the state standard at the Pasadena monitoring station occurred in 1991.

TABLE 5.2-15

NITROGEN DIOXIDE LEVELS AT THE PASADENA - SOUTH WILSON AVENUE MONITORING STATION, 1990-1999 (ppm)

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Highest 1-hour Average	0.230	0.320	0.220	0.180	0.183	0.225	0.198	0.171	0.166	0.153
Annual Average (NAAQS = 0.053 ppm)	0.047	0.050	0.042	0.039	0.042	0.037	0.037	0.034	0.035	0.037
Number of Days Exceeding:										
State Standard (0.25 ppm, 1-hour)	0	2	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, CARB.

5.2.2.4.3 Carbon Monoxide. CO is a product of inefficient combustion, principally from automobiles and other mobile sources of pollution. In many areas of California, CO emissions from wood-burning stoves and fireplaces can also be measurable contributors to high ambient levels of CO. Industrial sources typically contribute less than ten percent of ambient CO levels. Peak CO levels occur typically during winter months, due to a combination of higher emission rates and stagnant weather conditions. For purposes of air quality planning, the South Coast Air Basin is classified as being in non-attainment of the NAAQS for CO. With respect to state standards, the western portion of the basin is in non-attainment (including the project site), while the eastern portion is classified as being in attainment.

Table 5.2-16 shows the California and federal air quality standards for CO, and the maximum one-hour and eight-hour average levels recorded at the Burbank station during the period from 1990 through 1999.

Tables 5.2-17 and 5.2-18 show the levels of CO measured at the Los Angeles and Pasadena monitoring stations. At both of these stations, a gradual decline in CO levels has been shown over the period 1990 to 1999, with very few exceedences of either state and federal standards. The CO levels measured at Los Angeles and at Pasadena during the early part of the monitoring period (1990 through 1994) are lower than those measured at the Burbank station during the same time period. In addition, the number of exceedences of state and federal standards recorded at the Los Angeles and Pasadena stations were less than those recorded at the Burbank station.

TABLE 5.2-16

CARBON MONOXIDE LEVELS AT THE BURBANK - WEST PALM AVENUE MONITORING STATION, 1990-1999 (ppm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Highest 8-hour average	13.00	10.63	10.50	8.43	10.81	11.80	9.23	7.26	7.33	8.93
Highest 1-hour average	16	13	13	12	12.9	12.5	11.6	8.8	8.1	9.2
Number of days exceeding:										
State Standard (9 ppm, 8-hr)	9	13	3	0	5	7	1	0	0	1
State Standard (20 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (9 ppm, 8-hr)	9	8	3	0	5	5	0	0	0	0
Federal Standard (35 ppm, 1-hr)	0	9	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, CARB.

The levels of CO at the Burbank station have been steadily declining during the period 1990 through 1999, as have the number of days in which the state and federal standards have been exceeded.

TABLE 5.2-17

CARBON MONOXIDE LEVELS AT THE LOS ANGELES - NORTH MAIN STREET MONITORING STATION 1990-1999 (ppm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Highest 8-hour average	9.88	9.00	9.50	6.75	8.61	8.39	8.38	7.80	6.18	6.37
Highest 1-hour average	13	12	12	9	10.7	9.7	10.3	8.9	8.2	7.2
Number of days exceeding:										
State Standard (9 ppm, 8-hr)	1	0	1	0	0	0	0	0	0	0
State Standard (20 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (9 ppm, 8-hr)	1	0	1	0	0	0	0	0	0	0
Federal Standard (35 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, CARB.

TABLE 5.2-18

CARBON MONOXIDE LEVELS AT THE PASADENA - SOUTH WILSON AVENUE MONITORING STATION 1990-1999 (ppm)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Highest 8-hour average	10.86	9.50	7.25	6.25	8.76	9.13	7.14	5.99	6.30	6.58
Highest 1-hour average	16	14	11	11	12.4	11.4	10.7	8.10	8.4	8.7
Number of days exceeding:										
State Standard (9 ppm, 8-hr)	2	2	0	0	0	1	0	0	0	0
State Standard (20 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (9 ppm, 8-hr)	2	1	0	0	0	0	0	0	0	0
Federal Standard (35 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, CARB.

5.2.2.4.4 <u>Sulfur Dioxide</u>. SO_2 is produced when any sulfur-containing fuel is burned. It is also emitted by other facilities that treat or refine sulfur or sulfur-containing chemicals. Natural gas contains negligible amounts of sulfur, while fuel oils contain much higher amounts. Because of the complexity of the chemical reactions that convert SO_2 to other compounds (such as sulfates), peak concentrations of SO_2 occur at different times of the year in different parts of California, depending on local fuel characteristics, weather, and topography. The Basin is considered to be in attainment for SO_2 for purposes of state and federal air quality planning.

Table 5.2-19 presents the state air quality standard for SO_2 and the maximum levels recorded in Burbank from 1990 through 1999. The federal annual average standard is 0.03 ppm; during the period shown, the annual average SO_2 levels at Burbank have been well under the federal standard. The state 24-hour average standard is 0.04 ppm, which has not been exceeded in Burbank for the period shown.

Tables 5.2-20 shows the sulfur dioxide levels measured at the Los Angeles monitoring station for the period 1990 through 1999. As for the Burbank ambient monitoring station, the 24-hour sulfur dioxide levels and the 1-hour average sulfur dioxide levels measured at the Los Angeles station are well below the respective state and federal standards; and these standards have never been exceeded at the Los Angeles station. Sulfur dioxide is not measured at the Pasadena station.

TABLE 5.2-19

SULFUR DIOXIDE LEVELS AT THE BURBANK – WEST PALM AVENUE MONITORING STATION, 1990-1999 (ppm)

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Highest 1-hour Average	0.020	0.010	0.030	0.080	0.030	0.008	0.010	0.035	0.010	0.009
Highest 24-hour Average	0.011	0.010	0.009	0.010	0.009	0.004	0.006	0.005	0.007	0.003
Annual Average All Hours	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.002	0.001	0.000
Number of Days Exceeding:										
State Standard (0.25 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
State Standard (0.04 ppm, 24-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.5ppm, 3-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.14ppm, 24-hr)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, CARB

TABLE 5.2-20

SULFUR DIOXIDE LEVELS AT THE LOS ANGELES - NORTH MAIN STREET MONITORING STATION, 1990-1999 (ppm)

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Highest 1-hour Average	0.020	0.020	0.050	0.010	0.021	0.013	0.014	0.020	0.090	0.053
Highest 24-hour Average	0.013	0.013	0.010	0.007	0.008	0.008	0.008	0.011	0.006	0.010
Annual Average All Hours	0.002	0.002	0.001	0.000	0.002	0.002	0.002	0.002	0.001	0.003
Number of Days Exceeding:										
State Standard (0.25 ppm, 1-hr)	0	0	0	0	0	0	0	0	0	0
State Standard (0.04 ppm, 24-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.5ppm, 3-hr)	0	0	0	0	0	0	0	0	0	0
Federal Standard (0.14ppm, 24-hr)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, CARB.

5.2.2.4.5 <u>Particulate Sulfates</u>. Particulate sulfates are the product of further oxidation of SO_2. Elevated levels can also be due to natural causes, such as sea spray. The Basin is in attainment with the state standard for sulfates. There is no federal standard for sulfates.

Total suspended particulate (TSP) sulfates are not recorded at the Burbank monitoring station. Tables 5.2-21 and 5.2-22 show the California air quality standard for TSP sulfates and the maximum 24-hour average levels recorded at the Los Angeles and Pasadena monitoring stations from 1997 through 2000. Over the period shown, the maximum levels at both stations have not exceeded the state standard.

TABLE 5.2-21

TSP SULFATE LEVELS AT THE
LOS ANGELES – NORTH MAIN STREET MONITORING STATION
1997-2000 ($\mu g/m^3$)

	1997	**1998**	**1999**	**2000**
Highest 24-Hour Average	14.3	8.4	17.9	16.4
Number of Days Exceeding:				
State Standard ($25\ \mu g/m^3$, 24-hr)	0	0	0	0

All measurements represent 24-hour measurements taken once per week.
The 2000 data is up to and including July 23, 2000.
Source: California Air Quality Data, Annual Summary, CARB.

TABLE 5.2-22

TSP SULFATE LEVELS AT THE
PASADENA – SOUTH WILSON AVENUE MONITORING STATION
1997-2000 ($\mu g/m^3$)

	1997	**1998**	**1999**	**2000**
Highest 24-Hour Average	11.6	7.5	16.4	13.9
Number of Days Exceeding:				
State Standard ($25\ \mu g/m^3$, 24-hr)	0	0	0	0

All measurements represent 24-hour measurements taken once per week.
The 2000 data is up to and including July 23, 2000.
Source: California Air Quality Data, Annual Summary, CARB.

The levels of TSP sulfates recorded at the Pasadena monitoring station show a similar trend to the levels recorded at the Los Angeles monitoring station – an initial decrease followed by an increase in 1999, then a subsequent decrease in 2000.

5.2.2.4.6 Particulates (PM_{10} and $PM_{2.5}$). Particulates in the air are caused by a combination of wind-blown fugitive dust; particles emitted from combustion sources (usually carbon particles); and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and nitrogen oxides. In 1984, the CARB adopted standards for fine particulates (PM_{10}), and phased out the TSP standards that had previously been in effect. PM_{10} standards were substituted for TSP standards because PM_{10} corresponds to the size range of inhalable particulates related to human health. In 1987, the EPA also replaced national TSP standards with PM_{10} standards. For air quality planning purposes, the South Coast Air Basin is considered to be in non-attainment of both federal and state PM_{10} standards.

As discussed in Section 5.2.2.3, the EPA issued new particulate standards to become effective September 16, 1997. These new standards have not been implemented due to remanding back to the EPA by a federal appeals court. The new standards will not be in effect until the lawsuit is settled.

Table 5.2-23 shows the federal and state air quality standards for PM_{10}, maximum levels recorded at the Burbank monitoring station from 1990 to 1999, and geometric and arithmetic annual averages for the same period. (The geometric mean is the *n*th root of the product of *n* observations. The arithmetic annual average is simply the mean of all observations.) In Burbank, the maximum 24-hour PM_{10} levels exceed the state standard between 9 and 30 times per year. Over the 10-year period, however, the number of times that the state standard has been exceeded has decreased. The 24-hour federal standard of 150 $\mu g/m^3$ was exceeded in the years 1990 and 1992; since 1992 this standard has not been exceeded at the Burbank station.

Table 5.2-24 shows the ambient PM_{10} levels recorded at the Los Angeles monitoring station for the period 1990 through 1999. The highest 24-hour average PM_{10} values measured at the Los Angeles station are comparable to those measured at the Burbank station. Similarly, the 24-hour state standard has consistently been exceeded at the Los Angeles station (between 11 and 31 times over the nine year period), although the number of exceedences has decreased. The federal 24-hour standard has not been exceeded at the Los Angeles station over the period shown in Table 5.2-24.

TABLE 5.2-23

PM_{10} LEVELS AT THE BURBANK – WEST PALM AVENUE MONITORING STATION 1990-1999 ($\mu g/m^3$)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Highest 24-Hour Average	161	133	222	93	114	135	110	92	75	82
Annual Geometric Mean (State Standard = 30 $\mu g/m^3$)	47.9	49	42	39.1	34.5	37.2	37.6	41.9	32.8	40.6
Annual Arithmetic Mean (Federal Standard = 50 $\mu g/m^3$)	52	54.9	49	45	38.5	42.6	41.3	45	36.1	43.7
Number of Days Exceeding:[1]										
State Standard (50 $\mu g/m^3$, 24-hour)	28	30	18	21	11	15	15	17	9	21
Federal Standard (150 $\mu g/m^3$, 24-hour)	1	0	2	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, CARB.
[1] Based on measurements taken every six days.

TABLE 5.2-24

PM_{10} LEVELS AT THE LOS ANGELES – NORTH MAIN STREET MONITORING STATION, 1990-1999 ($\mu g/m^3$)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Highest 24-Hour Average	152	151	137	104	122	141	138	102	80	88
Annual Geometric Mean (State Standard = 30 $\mu g/m^3$)	48.3	51.4	44.1	42.8	41.1	36.4	36.6	39.2	34.5	42.1
Annual Arithmetic Mean (Federal Standard = 50 $\mu g/m^3$)	52.9	57	48.2	47.4	45.3	43.2	41	42.4	37.8	44.8
Number of Days Exceeding:[1]										
State Standard (50 $\mu g/m^3$, 24-hour)	31	31	22	26	20	14	11	15	11	19
Federal Standard (150 $\mu g/m^3$, 24-hour)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, California Air Resources Board.
[1] Based on measurements taken every six days.

$PM_{2.5}$ data are available from three sites within the South Coast Air Basin. One of these stations, the closest to the MPP site, is the Pasadena monitoring station. $PM_{2.5}$ has been monitored at this station since late February, 1999. During 1999, the maximum recorded $PM_{2.5}$ level was 59.7 $\mu g/m^3$. The maximum level recorded during 2000 (for the data period January 01, 2000 through June 25, 2000) was 54 $\mu g/m^3$. Since compliance with the EPA's proposed ambient standards will be based on three-year average levels, it is not possible to determine the compliance status at the Pasadena station. As discussed earlier, the new $PM_{2.5}$ standard will not be in effect until the lawsuit filed against the EPA is settled.

5.2.2.4.7 **<u>Airborne Lead</u>.** Lead in the air results from the combustion of fuels that contain lead. Twenty-five years ago, motor gasoline contained relatively large amounts of lead compounds used as octane-rating improvers, with the result that ambient lead levels were relatively high. Beginning with the 1975 model year, new automobiles began to be equipped with exhaust catalysts, which were poisoned by the exhaust products of leaded gasoline. Thus, unleaded gasoline became the required fuel for an increasing percentage of new vehicles, and a phase-out of leaded gasoline began. As a result, ambient lead levels have decreased dramatically, and for several years the South Coast Air Basin has been in attainment of state and federal airborne lead standards for air quality planning purposes.

Ambient lead levels are recorded at both the Burbank and the Los Angeles monitoring stations. Table 5-2-25 lists the levels recorded at the Burbank station between 1990 and 1999, and compares these levels to the state air quality standard for airborne lead. Maximum monthly levels are well below the state and federal standards. The NAAQS for lead is numerically the same as the state standard (1.5 $\mu g/m^3$), but because the averaging period is quarterly, not monthly, the NAAQS is less stringent. The level of airborne lead at the Burbank station shows a steady decline over the period 1990 through 1999.

TABLE 5.2-25

AIRBORNE LEAD LEVELS AT THE BURBANK – WEST PALM AVENUE MONITORING STATION, 1990-1999 ($\mu g/m^3$)

	1990	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
Highest Monthly Average	0.17	0.23	0.34	0.058	0.081	0.093	0.074	0.068	0.035	0.025
Number of Months Exceeding:										
State Standard (1.5 $\mu g/m^3$, monthly)	0	0	0	0	0	0	0	0	0	0
Federal Standard (1.5$\mu g/m^3$, quarterly)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, CARB.

Ambient lead levels recorded at the Los Angeles monitoring station are shown in Table 5.2-26. The levels recorded during the period 1990 through 1999 show a similar trend to the lead levels recorded at the Burbank station. Neither the state nor the federal standard were exceeded at the Los Angeles station during the period 1990 through 1999.

TABLE 5.2-26

AIRBORNE LEAD LEVELS AT THE LOS ANGELES – NORTH MAIN STREET MONITORING STATION, 1990-1999 ($\mu g/m^3$)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Highest Monthly Average	0.170	0.190	0.170	0.250	0.310	0.077	0.097	0.059	0.045	0.042
Number of Months Exceeding:										
State Standard (1.5 $\mu g/m^3$, monthly)	0	0	0	0	0	0	0	0	0	0
Federal Standard (1.5 $\mu g/m^3$, quarterly)	0	0	0	0	0	0	0	0	0	0

Source: California Air Quality Data, Annual Summary, CARB.

5.2.3 Laws, Ordinances, Regulations, and Standards (LORS)

Applicable federal, state, and local LORS that regulate air quality and air pollution issues are summarized in Table 5.2-27 and in Section 7.0. Table 5.2-27 also identifies the specific sections within this AFC that demonstrate compliance with the indicated LORS. Involved agencies are also briefly presented in Table 5.2-28. Concluding this section is a discussion of the consistency of the proposed MPP with the most significant air quality requirements for power plant operation.

5.2.3.1 Involved Agencies and Agency Contacts

Each level of government has adopted specific regulations that limit emissions from electrical power generation facilities and that are applicable to this project. The agencies with air quality permitting authority for this project are shown in Table 5.2-28. The authority, purpose, and administering agency for each of these are discussed in more detail below.

TABLE 5.2-27

LAWS, ORDINANCES, REGULATIONS, STANDARDS AND PERMITS FOR PROTECTION OF AIR QUALITY

LORS	Applicability	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Federal					
Clean Air Act (CAA) §§160-169A and implementing regulations, Title 42 United States Code (USC) §§7470-7491 (42 USC §§7470-7491), Title 40 Code of Federal Regulations (CFR) Parts 51 and 52 (40 CFR Parts 51 and 52). (Prevention of Significant Deterioration [PSD] Program)	Requires PSD review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies to pollutants for which ambient concentrations are lower than NAAQS.	SCAQMD, with EPA Region IX oversight	Not applicable	Not applicable	Section 5.2
CAA §§171-193, 42 USC §7501 et seq., 40 CFR Parts 51 and 52 (New Source Review [NSR])	Requires NSR facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which ambient concentration levels are higher than NAAQS.	SCAQMD, with EPA Region IX oversight	After project review, the agency issues a Permit to Construct [PTC] with conditions limiting emissions	Agency approval to be obtained before start of construction.	Section 5.2
CAA §401 (Title IV), 42 USC §7651 et seq., 40 CFR parts 51 & 52 (Acid Rain Program)	Requires reductions in NO_x and SO_x emissions.	SCAQMD, with EPA Region IX oversight	The agency issues Acid Rain permit after review of application.	Permit to be obtained prior to commencement of operation.	Section 5.2
CAA §501 (Title V), 42 USC §7414, 40 CFR Part 64 (Compliance Assurance Monitoring [CAM] Rule)	Establishes onsite monitoring requirements for emission control systems.	SCAQMD, with EPA Region IX oversight	If applicable, CAM requirements will be included in Title V permit as monitoring/reporting requirements.	Title V permit to be obtained prior to commencement of construction.	Section 5.2
CAA §501 (Title V), 42 USC §7661, 40 CFR Part 70 (Federal Operating Permits Program)	Establishes comprehensive operating permit program for major stationary sources.	SCAQMD, with EPA Region IX oversight	The agency issues Title V permit after review of application.	Permit to be obtained prior to commencement of construction.	Section 5.2

TABLE 5.2-27

(CONTINUED)

LORS	Applicability	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Federal 9continued)					
CAA §112, 42 USC §7412, 40 CFR Part 63 (National Emission Standards for Hazardous Air Pollutants [HAP])	Establishes national emission standards to limit HAPs from existing major sources of HAP emissions.	SCAQMD, with EPA Region IX oversight	After project review, the agency issues PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2.4.4
CAA §111, 42 USC §7411, 40 CFR Part 60 (New Source Performance Standards [NSPS])	Establishes national standards of performance for new stationary sources.	SCAQMD, with EPA Region IX oversight	After Project review, the agency issues PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2
Emergency Planning and Community Right-to-Know Act (EPCRA) §313 Toxic Release Inventory (TRI) Program	Requires subject facilities to report toxic releases to the environment.	EPA Region IX	Because the electric generating equipment will be fired by natural gas, the project is exempt from this regulation.	Not Applicable	Not Applicable
State					
California Health & Safety Code 17 (H&SC) §§ 44300-44384; California Code of Regulations (CCR) §§93300-93347 (Toxic "Hot Spots" Act)	Requires preparation and biennial updating of facility emission inventory of hazardous substances; risk assessments, notification, and plans to reduce risks.	SCAQMD, with CARB oversight	After project review, the agency issues a PTC with conditions limiting emissions.	Screening health risk assessment (HRA) submitted as part of AFC; CEC approval of AFC.	Section 5.2
California Public Resources Code §25523(a); 20 CCR §§ 1752, 1752.5, 2300-2309, and Division 2, Chapter 5, Article 1, Appendix B, Part(k) (CEC and CARB Memorandum of Understanding)	Requires that CEC's decision on PTC include requirements to assure protection of environmental quality. AFC is required to address air quality protection, including mitigation.	CEC	After project review, the agency issues Final Determination of Compliance (FDOC) with conditions limiting emissions.	CEC approval of AFC; the Final Determination of Compliance to be obtained prior to CEC approval.	Section 5.2

TABLE 5.2-27

(CONTINUED)

LORS	Applicability	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
State 9continued)					
H&SC §41700 (Public Nuisance)	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	SCAQMD, with CARB oversight	After project review, the agency issues a PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2
Local					
SCAQMD Regulation XIII, H&SC §§40910-40930 (Review of New or Modified Sources)	NSR: Requires that preconstruction review be conducted for all proposed new or modified sources of air pollution, including BACT, emissions offsets, and air quality impact analysis. NSR applies to pollutants for which ambient concentration levels are higher than state or federal AAQS.	SCAQMD, with CARB and EPA Region IX oversight	After project review, issues PTC with conditions limiting emissions. Note – since the Burbank Generating Station is an existing RECLAIM facility for NO_x, NSR is addressed under Regulation XX.	Agency approval to be obtained before start of construction.	Section 5.2
SCAQMD Air Quality Plan & H&SC §41914	Defines proposed strategies including stationary source control measures and new source review rules.	SCAQMD, with CARB oversight	Addressed in SCAQMD Rules and Regulations	Not applicable	Not applicable
SCAQMD Regulation XVII, H&SC §39500 et seq. (PSD Program)	Requires PSD review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies to pollutants for which ambient concentrations are lower than NAAQS.	SCAQMD, with CARB and EPA Region IX oversight	Not applicable	Not applicable	Section 5.2

TABLE 5.2-27

(CONTINUED)

LORS	Applicability	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Local (continued)					
SCAQMD Regulation IX, Part 60, Chapter I, Title 40, Subparts Da and GG, H&SC §40000 et seq. (Standards of Performance for New Stationary Sources)	By reference, incorporates the provisions of 40 CFR Part 60, Subparts Da and GG - Federal Standards of Performance for Electric Utility Steam Generating Units (Subpart Da) Stationary Gas Turbines (Subpart GG)	SCAQMD, with EPA Region IX oversight	After project review, the agency issues PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2
SCAQMD Regulation XX Rule 2005 (New Source Review for RECLAIM)	RECLAIM requires that preconstruction review be conducted for all proposed new or modified sources of air pollution at subject RECLAIM NO_x and SO_x facilities, including BACT, RECLAIM trading credits, and air quality impact analysis.	SCAQMD, with CARB and EPA Region IX oversight	After project review, the agency issues PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2
SCAQMD Regulation XXX, H&SC §40000 et seq., §40400 et seq. (Federal Operating Permits)	Implements operating permits requirements of CAA Title V.	SCAQMD, with CARB and EPA Region IX oversight	The agency issues Title V permit after review of application.	Permit to be obtained prior to commencement of construction.	Section 5.2
SCAQMD Regulation XXXI, H&SC §40000 et seq., §40400 et seq. (Acid Deposition Control)	Implements acid rain regulations of CAA Title IV.	SCAQMD, with CARB and EPA Region IX oversight	The agency issues Title IV permit after review of application.	Permit to be obtained prior to commencement of operation. The permit application must be submitted to the SCAQMD at least 24 months prior to commencement of operation.	Section 5.2

TABLE 5.2-27

(CONTINUED)

LORS	Applicability	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Local (continued)					
SCAQMD Rule 53.A, H&SC §40000 et seq., and H&SC §40400 et seq. (Specific Contaminants)	Limits SO_x and PM emissions from stationary sources.	SCAQMD, with CARB and EPA Region IX oversight	After project review, the agency issues PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2
SCAQMD Rule 201, H&SC §40000 et seq., and H&SC §40400 et seq. (Permit to Construct)	Defines procedures for review of new and modified sources of air pollution.	SCAQMD, with CARB and EPA Region IX oversight	After project review, the agency issues PTC with conditions limiting emissions.	Agency approval to be obtained before commencement of construction.	Section 5.2
SCAQMD Rule 401, H&SC §40000 et seq., §40400 et seq. (Visible Emissions)	Limits visible emissions to no darker than Ringelmann No. 1 for periods greater than 3 minutes in any hour.	SCAQMD, with CARB and EPA Region IX oversight	After project review, the agency issues PTC with conditions limiting emissions.	Agency approval to be obtained before commencement of construction.	Section 5.2
SCAQMD Rule 402, H&SC §40000 et seq., §40400 et seq. (Public Nuisance)	Prohibits emissions in quantities that cause injury, detriment or annoyance to the public, or that damage businesses or property.	SCAQMD, with CARB and EPA Region IX oversight	After project review, the agency issues PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2
SCAQMD Rule 403, H&SC §40000 et seq., §40400 et seq. (Fugitive Dust)	Limits fugitive dust emissions from man-made fugitive dust sources.	SCAQMD, with CARB and EPA Region IX oversight	After project review, the agency issues a PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2
SCAQMD Rule 407, H&SC §40000 et seq., §40400 et seq. (Liquid and Gaseous Air Contaminants)	Limits CO and SO_x emissions from stationary sources.	SCAQMD, with CARB and EPA Region IX oversight	Covered as part of Rule 431.1.	Not Applicable	Not Applicable
SCAQMD Rule 409, H&SC §40000 et seq., §40400 et seq. (Combustion Contaminants)	Limits PM emissions from fuel combustion.	SCAQMD, with CARB and EPA Region IX oversight	After project review, the agency issues a PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2

TABLE 5.2-27

(CONTINUED)

LORS	Applicability	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Local (continued)					
SCAQMD Rule 474, H&SC §40000 et seq., §40400 et seq. (Fuel Burning Equipment – Oxides of Nitrogen)	Limits NO_x emissions from stationary sources.	SCAQMD, with CARB and EPA Region IX oversight	Covered under Regulation XX.	Not Applicable	Not Applicable
SCAQMD Rule 475, H&SC §40000 et seq., §40400 et seq. (Electric Power Generating Equipment)	Limits PM emissions from stationary sources.	SCAQMD, with EPA Region IX CARB oversight	After project review, the agency issues PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2
SCAQMD Rule 476, H&SC §40000 et seq., §40400 et seq. (Steam Generating Equipment)	Limits NO_x and combustion contaminants from stationary combustion sources.	SCAQMD, with CARB and EPA Region IX oversight	Covered as part of Rule 475 and Regulation XX	Not Applicable	Not Applicable
SCAQMD Rule 431.1, H&SC §40000 et seq., §40400 et seq. (Sulfur Content of Gaseous Fuels)	Limits the sulfur content of natural gas to reduce SO_x emissions from stationary combustion sources.	SCAQMD, with CARB and EPA Region IX oversight	After project review, the agency issues PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2
SCAQMD Rule 431.2, H&SC §40000 et seq., §40400 et seq. (Sulfur Content of Liquid Fuels)	Limits the sulfur content of diesel fuel to reduce SO_x emissions from stationary combustion sources.	SCAQMD, with CARB and EPA Region IX oversight	After project review, the agency issues PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2
SCAQMD Rule 1110.2, H&SC §40000 et seq., §40400 et seq. (Emissions from Stationary Internal Combustion Engines)	Limits emissions of NO_x, VOC, and CO from stationary internal combustion engines. Engines are exempt from this rule if each unit is operated less than 200 hours per year.	SCAQMD, with CARB and EPA Region IX oversight	The project is exempt because each engine will be operated less than 200 hours per year.	Not Applicable	Not Applicable

TABLE 5.2-27

(CONTINUED)

LORS	Applicability	Regulating Agency	Permit or Approval	Schedule and Status of Permit	Conformance (Section)
Local (continued)					
SCAQMD Rule 1134, H&SC §40000 et seq., §40400 et seq. (Emissions of Oxides of Nitrogen from Stationary Gas Turbines)	Limits NO_x from stationary gas turbines.	SCAQMD, with CARB and EPA Region IX oversight	The project is exempt from regulation because the facility is regulated under Regulation XX.	Not Applicable	Not Applicable
SCAQMD Rule 1135, H&SC §40000 et seq., §40400 et seq. (Emissions of Oxides of Nitrogen from Electric Power Generating Systems)	Limits NO_x from electric power generating systems.	SCAQMD, with CARB and EPA Region IX oversight	The project is exempt from regulation because the facility is regulated under Regulation XX.	Not Applicable	Not Applicable
SCAQMD Rule 1146, H&SC §40000 et seq., §40400 et seq. (Emissions of Oxides of Nitrogen from Industrial, Institutional, and Commercial Boilers; Steam Generators, and Process Heaters)	Limits NO_x and CO from industrial, institutional, and commercial steam generating units.	SCAQMD, with CARB and EPA Region IX oversight	The project is exempt from regulation because the boilers are used to generate electricity.	Not Applicable	Not Applicable
SCAQMD Rule 1401, H&SC §§ 39650-39675 (New Source Review of Toxic Air Contaminants)	Establishes allowable risks for new or modified sources of toxic air contaminants and for control of emissions.	SCAQMD, with CARB and EPA Region IX oversight	After project review, issues PTC with conditions limiting emissions.	Agency approval to be obtained before start of construction.	Section 5.2

TABLE 5.2-28

AIR QUALITY AGENCIES

Agency	Authority	Contact
EPA Region IX	Oversight of permit issuance, enforcement	Gerardo Rios, Chief Permits Office EPA Region IX 75 Hawthorne Street San Francisco, CA 94105 (415) 744-1254
California Air Resources Board (CARB)	Regulatory oversight	Mike Tollstrop, Chief Project Assessment Branch California Air Resources Board 2020 L Street Sacramento, CA 95814 (916) 322-6026
South Coast Air Quality Management District (SCAQMD)	Permit issuance, enforcement	John Yee Sr. Air Quality Engineer South Coast Air Quality Management District 21865 E. Copley Dr. Diamond Bar, CA 91765-4182 (909) 396-2000

5.2.3.2 Permits Required

Table 5.2-27 also summarizes the air quality permits required for the proposed MPP. As shown in the table, the proposed project will trigger the requirements of Title IV, Title V, NSPS, NSR, and the RECLAIM programs. The requirements of each of these regulatory programs will be included in a single Title V permit issued by the SCAQMD.

PSD Requirements. PSD requirements are applicable on a pollutant-specific basis in areas that meet the federal ambient air quality standards (attainment areas). The SCAQMD is in attainment for NO_2 and SO_2. PSD permitting requirements under applicable EPA regulations (40 CFR 52.21), mandate that sources must provide the following as part of a PSD application:

- An analysis of BACT requirements under the federal definition for all applicable PSD pollutants. Note that the MPP must comply with the SCAQMD's more stringent BACT requirements. The BACT analysis is presented in Section 5.2.3.3 and Appendix H.2.

- An analysis of air quality impacts, including Class I and Class II increments and PSD significance levels, and an analysis of compliance with national and state AAQSs for applicable pollutants. The impact analysis is presented in Section 5.2.4.

- An analysis of impacts to applicable Air Quality Related Values (AQRV) in Class I areas. The AQRV analysis is presented in Section 5.2.4.5.

- Pre-application monitoring of meteorological and air quality conditions unless either facility impacts are below threshold levels, representative data are available, or worst case screening data is used. As discussed in section 5.2.1.1, representative data are available and no pre-construction monitoring is required.

As discussed in AFC sections referenced above, the MPP will be in compliance with these requirements.

National Emission Standards for Hazardous Air Pollutants (NESHAP). The EPA is in the process of establishing NESHAP for gas turbines. This regulation will apply to new or modified major sources of HAPs (as listed in Section 112 of the CAA). Because the HAP emissions for the project are below the major source thresholds of 10 tpy for a single HAP and 25 tpy for any combination of HAPs, the project is exempt from the NESHAP for gas turbines. Consequently, this regulation does not apply to the project and will not be addressed further. Note that while Section 5.16 discusses ammonia emissions greater than 25 tpy for the project, ammonia is not a HAP as defined by Section 112 of the CAA.

New Source Performance Standards. For the duct burner unit, Regulation IX (New Source Performance Standards), Subpart Da imposes a limit on the emissions of NO_x, SO_x, and PM_{10}, requires source testing of stack emissions, and requires emissions monitoring, data collection and recordkeeping. All of the BACT limits imposed on the facility will be more stringent than the requirements of the NSPS emission limits. Monitoring and recordkeeping requirements for BACT will be more stringent than the requirements in this rule. The MPP will comply with the NSPS Subpart Da regulation.

For the gas turbine, Regulation IX (New Source Performance Standards), Subpart GG requires monitoring of fuel, imposes limits on the emissions of NO_x and SO_x, requires source testing of stack emissions, process monitoring, data collection and recordkeeping. All of the BACT limits imposed on the facility will be more stringent than the requirements of the NSPS emission limits. Monitoring and recordkeeping requirements for BACT will be more stringent than the requirements in this rule. The MPP will comply with the NSPS Subpart GG regulation.

Title IV and V Requirements. Regulation XXX (Title V permit program) applies to facilities that have the potential to emit more than 10 tpy for VOCs or NO_x, 50tpy for CO, 70tpy for PM_{10}, or 100tpy for CO. Under the Title V permit program, the installation of the new gas turbine will be considered a major source and a permit application must be submitted to the SCAQMD. The acid rain requirements of Regulation XXXI (Title IV program) are also applicable to the facility. As an acid rain facility, the Applicant will be required to provide sufficient allowances for every ton of SO_x emitted during a calendar year. As required, the Applicant will obtain any necessary allowances on the current open trade market. The power plant is also required to install and operate continuous monitoring systems on the new units (monitoring of operating parameters such as fuel use and fuel constituents is an allowable alternative to using exhaust CEM systems). The MPP will comply with the applicable requirements of the Title IV and V regulations.

CAM Requirements. Facilities are required to monitor the operation and maintenance of emissions control systems and report any control system malfunctions to the appropriate regulatory agency. The CAM rule applies to emissions units with uncontrolled potential to emit levels greater than applicable major source thresholds. However, the CAM rule does not apply to the project since the facility will be issued a Title V permit requiring the installation and operation of continuous emissions monitoring systems.

Consistency with State Requirements. State law establishes local air pollution control districts and air quality management districts with the principal responsibility for regulating emissions from stationary sources. As discussed in this section, the facility is under the local jurisdiction of the SCAQMD, and compliance with their regulations will ensure compliance with state air quality requirements.

Consistency with Local Requirements. The SCAQMD has been delegated responsibility for implementing local, state, and federal air quality regulations including NSR and RECLAIM permitting programs in the project area. The facility is subject to SCAQMD regulations that apply to new sources of emissions, to the prohibitory regulations that specify emission standards for individual equipment categories, and to the requirements for evaluation of impacts from toxic air pollutants.

Under the regulations that govern new sources of emissions, the Applicant is required to secure preconstruction approvals from the SCAQMD, as well as demonstrate continued compliance with regulatory limits when the facility becomes operational. The NSR/RECLAIM preconstruction review includes demonstrating that the facility will use BACT; providing any necessary emission offsets; demonstrating that emissions will not interfere with the attainment or maintenance of the applicable AAQS and will not exceed SCAQMD significance levels; and demonstrating that the emissions will not impair visibility in nearby Class I areas. The following sections include the evaluation of facility compliance with the applicable SCAQMD NSR/RECLAIM requirements.

SCAQMD Regulations XIII and XX require the CT, duct burner, and the auxiliary boiler be equipped with BACT for an emissions increase of NO_x, VOC, SO_x, CO, and PM_{10} (criteria pollutants) and for NH_3. The calculation of facility emissions is discussed in Section 5.2.4.

BACT for the applicable pollutants was determined by reviewing the following: the SCAQMD BACT Guidelines Manual; the Bay Area AQMD BACT Guidelines Manual (the most recent Compilation of California BACT Determinations); CAPCOA (2nd Ed., November 1993); the EPA's BACT/LAER Clearinghouse; and the CARB's Guidance for Power Plant Siting and Best Available Control Technology. A summary of the review is provided in Appendix H.2. For the CT, the SCAQMD considers BACT to be the most stringent level of demonstrated emission control that is feasible. The gas turbine and auxiliary boiler associated with the MPP will use the BACT measures discussed below at the facility.

As a BACT measure, the Applicant will limit the fuels burned by the gas turbine and duct burner to natural gas, a clean burning fuel. Burning of liquid fuels in the CT and duct burner would result in greater criteria pollutant emissions than if the units burned only gaseous fuels. This voluntary limitation will act to minimize the formation of all criteria air pollutants.

For the CT, BACT for NO_x emissions will be the use of low NO_x emitting equipment and add-on controls. For the MPP, the Applicant has selected a gas turbine equipped with dry low NO_x combustors. The CT dry low NO_x combustors will generate approximately 9 (GE) or 25 (Westinghouse) ppmvd NO_x, corrected to 15 percent O_2. In addition, the gas turbine will be equipped with a SCR system to further reduce NO_x emissions to 2.0 ppmvd NO_x, corrected to 15 percent O_2 (on a three-hour average basis). The 2.0 ppmv NO_x level has been accepted by the BAAQMD and EPA Region IX as meeting the BACT requirements for NO_x from gas turbines, and is consistent with the SCAQMD BACT guideline for larger combustion turbines and the CARB's adopted BACT guidelines for power plants. The SCAQMD BACT Guideline determinations for NO_x from combustion turbines are shown in Appendix H.2.

For the auxiliary boiler, NO_x emissions will be limited to the SCAQMD BACT level of 12 ppmv at 3 percent O_2.

For the CT, use of good combustion controls and the use of an oxidation catalyst will achieve BACT for CO emissions. With this technology, the gas turbine will meet a CO limit of 6 ppmvd, corrected to 15 percent O_2. The BAAQMD has revised the BACT determination for combustion turbines from 6 ppm to 10 ppm CO, corrected to 15 percent O_2. The SCAQMD BACT guidelines indicate that BACT from large gas turbines larger than 3 MW is an exhaust concentration not to exceed 10 ppmvd CO, corrected to 15 percent O_2. CO emissions from the MPP gas turbine are consistent with this BACT requirement. A review of recent BACT determinations for CO from combustion turbines is provided in Appendix H.2.

The CARB BACT guidelines for combustion turbines suggest a CO level of 6 ppmvd at 15 percent O_2 (3-hour average), based principally on the use of oxidation catalyst technology, for CO non-attainment areas. In attainment areas, such as the project area, for the state standard, CARB has given districts the discretion to set the BACT level for CO. The BACT level for CO in attainment areas is generally considered to be 10 ppmvd. The Applicant's proposed 6 ppmvd level (short-term average) with the use of oxidation catalyst technology is consistent with this requirement.

Based on the SCAQMD BACT guidelines, BACT for the auxiliary boiler for CO will be limiting CO emissions to 50 ppm at 3 percent O_2.

For the CT, BACT for VOC emissions will be achieved by the use of a dry low NO_x combustor. As in the case of CO emission formation, dry low NO_x combustors use air to fuel ratios that result in low combustion VOC while still maintaining low NO_x levels. BACT for VOC emissions from combustion devices has historically been the use of best combustion practices since the majority of the VOC emissions are low molecular weight compounds that are not susceptible to control by the oxidation catalysts. With the use of the dry low NO_x combustors, VOC emissions leaving the CT stack will be less than 2 ppmvd at actual O_2 levels (3-hour average), with no duct burning. Under duct burning operations the VOC emissions will not exceed 6 ppmvd at 15 percent O_2. This level of emissions is consistent with the CARB's BACT requirements for VOCs.

For the auxiliary boiler, BACT for VOCs will consist of the use of natural gas and good combustion practices.

For the CT and auxiliary boiler, BACT for PM_{10} and SO_2 is best combustion practices and the use of gaseous fuels. Use of clean burning natural gas fuel will result in minimal particulate emissions.

For the CT and duct burner, BACT for NH_3 will be limiting ammonia slip to 5 ppmvd at 15 percent O_2. This level of emissions is below the CARB's BACT requirements for ammonia.

Offset Requirements. The project will provide emission offsets for all criteria pollutants in accordance with the applicable rules and regulations of the SCAQMD. Since this project will be subject to the SCAQMD RECLAIM program, NO_x emissions will be offset utilizing RECLAIM Trading Credits (RTC). Since RTC are provided through a market-based system, the project will obtain NO_x RTC through purchases of the necessary SCAQMD-certified emission credits on the RECLAIM RTC market. Prior to the issuance of the SCAQMD Permit to Construct (PTC), the Applicant will have in place the required first year RTC allocation (2004, Cycle 1).

Emission offsets for ROG, PM_{10}, SO_x, and CO will be provided through the acquisition of SCAQMD-certified Emission Reduction Credits (ERC) from the market-based ERC program. Prior to the issuance of the SCAQMD PTC, the Applicant will have in place the required ERC for ROG, PM_{10}, SO_x, and CO.

Modeling Analysis. Regulation XIII also requires project denial if SO_2, PM_{10}, or CO air quality modeling results indicate that emissions will interfere with the attainment or maintenance of the applicable AAQS or will exceed SCAQMD significance levels. The RECLAIM regulations include a similar requirement for NO_x emission increases. The modeling analyses presented in Section 5.2.4 show that facility emissions will not interfere with the attainment or maintenance of the applicable air quality standards, and will not result in impacts greater than the SCAQMD significance levels. Note that the SCAQMD has proposed to change the significance levels for attainment areas of NO_2. The project is within such an area. If the changes are adopted as currently proposed, the project may opt to not use the auxiliary boiler to preheat the SCR catalyst prior to startup. Additional ambient modeling would be performed to assess impacts without the auxiliary boiler under start-up conditions.

Visibility Analysis. For major facilities, such as the MPP, Regulation XIII requires projects with net emission increases greater than 15 tpy of PM_{10} to perform visibility analyses to determine impacts on nearby Class I areas. Regulation XX (RECLAIM) includes a similar requirement for NO_x net emission increases greater than 40 tpy. The visibility analyses presented in Section 5.2.4.5 show that the facility emissions will not cause a significant visibility impact on nearby Class I areas.

General Prohibitory Rules. The general prohibitory rules of the SCAQMD applicable to the facility and the determination of compliance follow.

Rule 53A (Specific Contaminants). Emissions from the new CT and duct burner will be well below the SO_x and particulate limits of this rule due to the use of natural gas.

Rule 401 (Visible Emissions). Any visible emissions from the project will not be darker than No.1, when compared to a Ringlemann Chart, for any period(s) aggregating 3 minutes in any hour. Because the facility will burn clean fuels, the opacity standard of not greater than 20 percent for a period or periods aggregating three minutes will not be exceeded.

Rule 402 (Public Nuisance). The facility will emit insignificant quantities of odorous or visible substances; therefore, the facility will comply with this regulation.

Rule 403 (Fugitive Dust). Since best available control measures will be used during the construction of the project, fugitive dust emissions will be below the limits of this rule. During the operation of the facility, there will be minimal fugitive dust emissions, and the facility will comply with the regulation.

Rule 409 (Combustion Contaminants). Because the CT, duct burner, and auxiliary boiler will use only natural gas, the plant emission unit rates will be well below the particulate matter limits of the rule.

Rule 431.1 (Sulfur Content of Gaseous Fuels). The natural gas used by the facility will have a sulfur content below the limit of this rule.

Rule 475 (Electric Power Generating Equipment). Emissions from the new gas turbine and duct burner will be well below the particulate limits of this rule due to the use of natural gas

Air Toxic Rules.

Rule 1401 (New Source Review of Toxic Air Contaminants [TAC]). This regulation establishes allowable risks for new or modified sources of TAC emissions. Rule 1401 specifies limits for maximum individual cancer risk (MICR), cancer burden, and non-carcinogenic acute and chronic hazard indices for new or modified sources of TAC emissions. As shown in Section 5.16, the proposed project will not cause toxic air pollutant impacts greater than the Rule 1401 significance levels.

5.2.4 Environmental Consequences

The EPA, CEC and SCAQMD regulations require various air quality impact assessments for the MPP. The environmental consequence analysis includes quantification of air emissions from the proposed facility and an estimate of the ambient air impacts using EPA-approved dispersion models. An air dispersion modeling protocol was submitted to the SCAQMD and CEC (February 2001); comments received from the CEC were incorporated into the analysis. A screening modeling analysis was performed for GE and Westinghouse turbines to determine which turbine would demonstrate the "worst-case" ambient air quality impacts. Based on the results of the screening analysis, the Westinghouse turbine was selected as the worst case turbine for all pollutants except PM_{10}. The screening level impacts for PM_{10} were similar for both the GE turbine and the Westinghouse turbine, therefore refined modeling of PM_{10} was done for both. Refined modeling for NO_2, CO, and SO_2 was based on the Westinghouse turbine. Refined modeling scenarios include the proposed equipment, anticipated operation, turbine start-up, and commissioning activities. NO_2, CO, SO_2, and PM_{10} emissions from construction activities have been estimated and modeled. In accordance with regulatory policies, no photochemical modeling of ozone formation was conducted. Ozone impacts will be fully mitigated by VOC and NO_2 offsets at ratios that meet SCAQMD goals for reasonable further progress.

At the specific request of the CEC, power generation units at the existing COB facility have also been modeled. The proposed MPP has no authority to alter or direct operations of these units. Therefore, while the modeling results are presented, they are not compared to significance levels or emission standards.

In California’s deregulated power market, this proposed power plant is expected to displace some of the older thermal power plants that currently operate on the grid. These older plants are much less efficient and emit air pollutants at much higher rates per megawatt-hour (MWh). The proposed MPP is predicted to have predominantly insignificant impacts locally and regionally. Emissions at the MPP will be fully offset by acquiring offsets at a ratio equal to or greater than 1:1.

The MPP emission sources include one natural gas-fired GE 7FA or Westinghouse 501F CT, one HRSG equipped with a duct burner, one auxiliary boiler, and one 6-cell linear wet mechanical draft cooling tower. Actual operation of the CT is anticipated to range between 45 percent and 100 percent of maximum rated output. The Westinghouse turbine cannot support operations at lower loads and will be operated at a range of 75 and 100 percent of maximum rated output. Emission control systems would be fully operational during all modes of operation except during startup and shutdown periods. Maximum annual emissions are based on operation of the facility at maximum firing rates and include the expected maximum number of startups that may occur in a year. An auxiliary boiler will be used to pre-heat emissions control systems. This will lower emission rates during CT startups until steady-state operation for the gas turbine and emissions control systems is achieved.

The following sections describe the emission sources that have been evaluated for the facility, the analyses of ambient impacts, and the evaluation of facility compliance with the applicable air quality regulations. Health risk impacts and air toxic emissions are presented in Section 5.16, Public Health.

5.2.4.1 Construction and Demolition Emissions and Impacts

Analysis of the potential ambient impacts from air pollutants (specifically NO_2, SO_2, PM_{10} and CO) during the demolition and removal of the existing boilers (Magnolia 1 and Magnolia 2) and the construction of the new equipment includes an assessment of emissions from vehicle and equipment exhaust and the fugitive dust generated from material handling. A detailed analysis of the emissions and ambient impacts is included in Appendix H.3. With the exception of the maximum modeled 1-hour NO_2 concentration, the results of the analysis indicate that the maximum construction and demolition impacts will be below the state and federal standards for all the criteria pollutants emitted. Best available emission control techniques will be used.

5.2.4.2 Operational Emissions

5.2.4.2.1 Emissions from the New Equipment. As discussed in Section 3.0, the new equipment consists of one natural gas-fired CT rated at a nominal 250 MW, one HRSG equipped with a supplementary duct burner rated at 630 MMBtu/hr (HHV), one auxiliary boiler rated at 6.13 MMBtu/hr, and one 6-cell linear mechanical draft wet cooling tower. The new equipment will burn natural gas exclusively. Typical specifications for natural gas fuel are shown in Table 5.2-29.

The combustion process results in the formation of NO_x, SO_x, VOCs, HAPs, PM_{10}, and CO. The new CT will be equipped with dry low NO_x combustors that minimize NO_x formation. The duct burner will be equipped with a low NO_x burner design that also minimizes NO_x formation. To further reduce NO_x emissions, an SCR control system will be used. Operation of the SCR system will result in emissions of unreacted ammonia (NH_3). Emissions of CO will be reduced through the use of an oxidation catalyst. Additionally, there will be some collateral reduction in VOCs and HAP emissions by the oxidation catalyst. PM_{10} and SO_x emissions will be minimized through the use of good combustion practices and through the exclusive use of natural gas fuel.

Criteria pollutant emission rates have been estimated using vendor data, facility design criteria, and established emission calculation procedures. Maximum hourly emission rates occur during periods of duct burning at high ambient air temperatures and are summarized in Table 5.2-30. It is assumed that duct burning will only be necessary in the summer months during high ambient temperature conditions. It is assumed that the use of duct burning conditions will be limited to 1,000 hours per year. Maximum emission rates for non-duct burning operating scenarios occur at full load and an ambient temperature of 45° F and are summarized in Table 5.2-31. The turbine is assumed to operate under non-duct burning conditions for the remainder of the year (up to total annual operations of 95%).

TABLE 5.2-29

TYPICAL NATURAL GAS ANALYSIS[1]

Parameter	Value
Carbon Dioxide	1.23%
Nitrogen	0.65%
Methane	95.85%
Ethane	1.81%
Propane	0.32%
Butane	0.09%
Pentane	0.03%
Hexane and higher	0.02%
Sulfur Content	Less than 0.20 gr/100 dscf
Heating Value	970 – 1150 Btu/ft^3 23,895 Btu/lb

[1] City of Burbank standard gas quality specifications.

TABLE 5.2-30

DUCT BURNING EMISSIONS (WESTINGHOUSE TURBINE ALTERNATIVE 95°F)

Pollutant	ppmvd @ 15% O_2	Lb/MMBtu[1]	lbs/hr
NO_x	2.0	0.09	18.05
CO	6.0	0.06	27.48
VOC	5.64	0.0071	17.74
PM_{10}[2]	------	0.0095	18
SO_x[3]	0.12	0.0006	1.47

Basis:

[1] lb/MMBtu emissions reflect controls and heat input rates to combustion turbine and duct burner.

[2] 100 percent of PM emissions assumed to be emitted as PM_{10}; PM_{10} emissions include both front and back half.

[3] Based on expected maximum fuel sulfur content of 0.21 gr/100 dscf fuel.

TABLE 5.2-31

NON-DUCT BURNING EMISSIONS (WESTINGHOUSE TURBINE ALTERNATIVE, 41° F) [1]

Pollutant	ppmvd @ 15% O_2	Lb/MMBtu	lbs/hr
NO_x	2.0	0.0072	13.70
CO	6.0	0.0131	24.90
VOC	2.0	0.0015	2.83
PM_{10} [2]	--	0.0063	12
SO_x [3]	0.15	0.0006	1.12

Basis:
1 Emission rates shown reflect the highest value at any operating load.
2 100 percent of PM emissions assumed to be emitted as PM_{10}; PM_{10} emissions include both front and back half.
3 Based on expected maximum fuel sulfur content of 0.21 gr/100 dscf fuel.

Maximum emission rates expected to occur during a start-up or shut-down are shown in Table 5.2-32. PM_{10} and SO_x emissions have not been included in this table because emissions of these pollutants will be lower during a startup period than during facility operation due to reduced fuel and mass flow through the CT.

TABLE 5.2-32

FACILITY STARTUP AND SHUTDOWN EMISSION RATES [1]

	NO_x	CO	VOC
Warm Start (2.1 hr duration)			
lbs/event	48	300	20
lbs/hr	23	143	10
Hot Start (1.5 hr duration)			
lbs/event	34.5	428	30
lbs/hr	23	285	20
Shutdown (0.5 hr duration)			
lbs/event	25	120	17
lbs/hr	50	240	34

1 Estimated based on vendor data and source test data. See Appendix H.4.

The maximum firing rates and anticipated operating scenarios for the CT and duct burner were used to estimate daily and annual fuel consumption rates. The maximum heat input rates (fuel consumption rates) for the combined cycle operation are shown in Tables 5.2-33 and 5.2-34. These are based on a maximum of 8,322 operating hours per year (95% operating capacity), with the turbine operating at 100 percent load with ambient conditions of 41° F at 100 percent relative humidity and during duct burning at 95° F and 26.6 percent relative humidity.

TABLE 5.2-33

MAXIMUM COMBUSTION TURBINE HEAT INPUT RATES (HHV) (41° F)

Heat Input Rate	
1-hour	1,908 MMBtu/hour
24-hour	45,792 MMBtu/day
Annual	16,714,080 MMBtu/year

TABLE 5.2-34

MAXIMUM COMBINED-CYCLE OPERATION HEAT INPUT RATES (HHV) (95° F)

Period	Combustion Turbine Only	Duct Burner Only	Total Fuel Use Combustion Turbine/Duct Burner	
Per Hour	1,886	631	2,517	MMBtu/hr
Per Day	45,264	7,572	52,836	MMBtu/day
Per Year	13,358,530	631,000	13,989,538	MMBtu/yr

Analysis of maximum emission rates from the new equipment was based on the emission rates during typical operations shown in Tables 5.2-30 and 5.2-31, the expected startup emission rates shown in Table 5.2-32, and anticipated operating scenarios. Maximum emissions for each period were determined by evaluating the following operating cases for hourly, daily, and annual operations.

- Maximum One-Hour Emissions:
  - The CT in startup mode (hot and warm start up).
  - Operations during duct burning.
  - The associated cooling tower emissions (PM_{10} only).

- Maximum Eight-Hour Emissions:
  - The CT in startup mode (warm start) for 2 hours, followed by 6 hours at full load operation.
  - Operations during duct burning.
  - The cooling tower emissions (PM_{10} only).

- Maximum 24-Hour Emissions:
  - The CT in startup mode (warm start) for 2 hours, followed by 22 hours at full load operation.
  - Operations during duct burning.
  - The cooling tower emissions (PM_{10} only).

- Maximum Annual Emissions:
  - 104 startups and shutdowns for the CT.
  - The CT operates at full load for the remaining 7,083 hours.
  - The duct burning for 1,000 hours per year.
  - The auxiliary boiler operates for 156 hours per year.
  - The cooling tower (PM_{10} emissions only).

The auxiliary boiler emissions were not included in the 1-hour, 8-hour or 24-hour operating scenarios because the unit would not be operated during a start-up or during normal operations. The boiler would also not significantly contribute to total emissions during the 24-hour scenario when compared to the CT emissions. Annual emission rates are based on an annual average ambient temperature and emission rates for these scenarios are lower than the short-term maximum emission rates shown in Tables 5.2-30 and 5.2-31. The maximum modeled emissions for the new equipment are shown in Table 5.2-35. Detailed emission calculations are contained in Appendix H4.

TABLE 5.2-35

MODELED EMISSIONS FROM NEW EQUIPMENT[1]

	NO_x	CO	SO_x	PM_{10}
Maximum 1-Hour Emissions (lbs/hr)				
Combustion Turbine and Duct Burner[2]	23	285	1.5	--
Maximum 3-Hour Emissions (lb/3-hrs)				
Combustion Turbine and Duct Burner[2]	--	--	4.5	--
Maximum 8-Hour Emissions (lbs/8-hrs)				
Combustion Turbine and Duct Burner[2]	--	642	--	--
Maximum 24-Hour Emissions (lbs/24-hrs)				
Combustion Turbine and Duct Burner[2]	--	--	31.1	360
Cooling Tower	--	--	--	7.25
Maximum Annual Emissions (tpy)				
Combustion Turbine and Duct Burner[2]	61.0	--	4.89	53.1
Cooling Tower	–	--	–	1.32
Auxiliary Boiler	0.017	0.017	2.8×10^{-4}	0.002

1 See Appendix H.4.
2 Includes startup emissions.

5.2.4.2.2 <u>Emissions from the City of Burbank Facility</u> The existing COB Generating Station consists of four natural gas-fired utility boilers: Olive Units 1 and 2 and Magnolia Units 3 and 4. In addition, there are three combustion turbines; Olive Units 3 and 4 and Magnolia Unit 5. All of these units except for Magnolia Units 3 and 4 will continue to operate after the installation of the new equipment.

Following CEQA guidelines, emissions from the existing COB sources were estimated using actual historical emissions data. The SCAQMD NSR and PSD regulations define historical emissions as the average emissions during the most recent two years. In cases where the most recent years are not representative of normal operations, the SCAQMD may allow the use of an alternative historical operating period. For this analysis, the most recent complete data set (July 1998 through June 2000) was used for Olive Units 1 through 4 and Magnolia Unit 5.

Fuel use for Olive Units 1 through 4 and Magnolia Unit 5 during the historical operating period, along with emission calculations, are shown in Appendix H.5. The historical operating emissions for these units are shown in Table 5.2-36.

TABLE 5.2-36

**OPERATING EMISSIONS FOR
EXISTING COB POWER GENERATING STATION
JULY 1998 - JUNE 2000 (tpy)**

	Olive 1	Olive 2	Olive 3	Olive 4	Magnolia 5
NO_x[1]	26.52	33.76	15.88	9.12	5.46
NO_x (lbs/hr)[2]	45.397	71.198	---	158.94	112.72
SO_x	0.16	27.19	0.034	0.019	0.012
CO	22.20	0.19	4.83	2.77	1.66
PM_{10}	2.00	2.46	0.39	0.22	0.13

Note: Existing source modeling performed only for attainment pollutants (NO_2).
1 Annual emission rates used in modeling analyses.
2 Maximum hourly emission rates used in modeling analyses.

<u>Non-criteria Pollutant Emissions</u> Non-criteria pollutants are substances that have been identified as pollutants that may cause adverse human health effects. Nine of these pollutants are regulated under the federal NSR program: lead, asbestos, beryllium, mercury, fluorides, sulfuric acid mist, hydrogen sulfide, total reduced sulfur, and reduced sulfur compounds. In addition to these 9 substances, the EPA has listed 189 compounds as potential hazardous air pollutants (CAA Sec.112(b)(1)); many of these are also regulated under the California Air Toxics "Hot Spots" Act. The SCAQMD Rule 1401 also lists compounds that are potential toxic air contaminants. Non-criteria pollutant emissions from the boiler and gas turbine are summarized in the Section 5.16, Public Health.

5.2.4.3 <u>Operational Air Quality Impact Analysis</u>.

5.2.4.3.1 <u>Air Quality Modeling Methodology</u>. An assessment of impacts on ambient air quality of the proposed facility has been conducted using EPA-approved air quality dispersion models. These models are based on fundamental mathematical descriptions of atmospheric processes in which a pollutant source can be related to a receptor area. The modeling analysis was performed pursuant to a modeling protocol submitted to the SCAQMD and the CEC (see Appendix H.6).

The impact analysis was used to determine the worst-case ground level impacts of the project. The results were compared with established ambient air quality standards and significance levels. If the standards are not violated and significance levels are not exceeded under worst-case conditions, then no adverse impacts are expected under any conditions. In accordance with the air quality impact analysis guidelines (EPA, 1998; CARB, 1989), the ground level impact analysis includes the following worst-case dispersion conditions:

- Impacts in simple terrain
- Impaction of plume on elevated terrain
- Aerodynamic downwash due to nearby building(s), and
- Impacts from fumigation conditions.

Simple terrain impacts were assessed for meteorological conditions that would cause the plume to loop, cone, or fan out. Looping plumes occur when the atmosphere is very unstable, such as on a bright sunny afternoon when vigorous convective mixing of the air can transport the entire plume to ground level near the source. Coning plumes occur throughout the day when the atmosphere is neutral or slightly unstable. Fanning plumes are most common at night when the atmosphere is stable and vertical motions are suppressed.

Plume impaction on elevated terrain, such as on the slope of a nearby hill, can cause high ground level concentrations, especially under stable atmospheric conditions. High ground level pollutant concentrations can also be caused by building downwash. Building downwash occurs when a building is in close proximity to the emission stack, which results in plume wake around the building. The stack plume is drawn downward to the ground by the lower pressure region that exists in the turbulent wake on the lee side of an adjacent building.

Fumigation conditions occur when a stable layer of air lies a short distance above the release point of the plume and an unstable air layer lies below. The low mixing height that results from this condition allows little diffusion of the stack plume before it is carried downwind to the ground. Although fumigation conditions rarely last as long as an hour, relatively high ground level concentrations may be reached during that period. Fumigation tends to occur under clear skies and light winds, and is more prevalent in the summer.

The basic model equation used in this analysis assumes that the concentrations of emissions within a plume can be characterized by a Gaussian distribution about the centerline of the plume (see Figure 5.2-18). Concentrations of an emitted substance at any location downwind of a point source, such as a stack, can be determined from the following equation:

$$C(x,y,z,H) = \left(\frac{Q}{2\pi\sigma_y\sigma_z u}\right) * \left(e^{-1/2\left(y/\sigma_y\right)^2}\right) * \left[\left\{e^{-1/2\left(z-H/\sigma_z\right)^2}\right\} + \left\{e^{-1/2\left(z+H/\sigma_z\right)^2}\right\}\right]$$

where:

C = the concentration in the air of the substance or pollutant in question

Q = the pollutant emission rate

σ_y, σ_z = the horizontal and vertical dispersion coefficients, respectively, at downwind distance x

u = the wind speed at the height of the plume center

x,y,z = the variables that define the 3-dimensional Cartesian coordinate system used; the downwind, crosswind, and vertical distances from the base of the stack (see Figure 5.2-18)

H = the height of the plume above the stack base (the sum of the height of the stack and the vertical distance that the plume rises due to the momentum and/or buoyancy of the plume)

The Gaussian dispersion models approved by EPA for regulatory use are generally conservative (i.e., the models tend to over predict actual impacts). The EPA models were used to determine if ambient air quality standards might be exceeded, and whether a more accurate and sophisticated modeling procedure would be warranted to make the impact determination. The following sections describe:

- Screening procedures
- Refined air quality impact analysis
- Existing ambient pollutant concentrations and preconstruction monitoring
- Results of the ambient air quality modeling analyses, and
- PSD increment consumption.

The screening and refined air quality impact analyses were performed using the latest version of the Industrial Source Complex, Short-Term Model ISCST3 (Version 00101). ISCST3 is a Gaussian dispersion model capable of assessing impacts from a variety of separate sources in regions of simple, intermediate, and complex terrain. The model can account for settling and dry deposition of particulates; area, line, and volume sources; plume rise as a function of downwind distance; separation of point sources; and elevated receptors. The model is capable of estimating concentrations for a wide range of averaging times (from one hour to one year or more). Impacts in simple terrain under downwash conditions, particularly areas close to the stack where building downwash may occur, were also estimated using the ISCST3 model.

Inputs required by the ISCST3 model include the following:

- Model options

- Meteorological data
- Receptor data, and
- Source data.

Model options refer to user selections that account for conditions specific to the area being modeled or to the emissions source that needs to be examined. Examples of model options include the use of site-specific vertical profiles of wind speed and temperature; consideration of stack and building wake effects; and time-dependent exponential decay of pollutants. The model suggests recommended default options for the user. Except where explicitly stated, such as for building downwash (described in more detail below), default values were used. A number of these default values are required for EPA and SCAQMD approval of model results. The EPA regulatory default options used include stack tip downwash effects and buoyancy-induced dispersion for heated effluent.

The performance of ISCST3 is improved by the use of actual meteorological data. The EPA criteria for determining whether the meteorological data are representative are the proximity of the meteorological monitoring site to the area under consideration; the complexity of the terrain; the exposure of the meteorological monitoring site; and the period of time during which the data are collected. The meteorological data set determined to be representative for use for the proposed MPP consists of data collected by the SCAQMD at the Burbank Meteorological Station in 1981. These data meet the EPA criteria (EPA, 1995) for representativeness, as follows:

- Proximity: The data were collected within five miles of the project site, and thus meet the criteria for proximity.

- Complexity of Terrain and Exposure of Meteorological Monitoring Site: The terrain surrounding the meteorological station is the same as the terrain surrounding the project. The project and the meteorological monitoring stations are located in a valley that runs from northwest to southeast between the Verdugo Mountains and the Santa Monica Mountains.

- Period of Data Collection: The 1981 data set is one complete year of data.

The required emission source data inputs to ISCST3 include source locations, source elevations, stack heights, stack diameters, stack exit temperatures and velocities, and emission rates. The source locations are specified for a Cartesian (i.e., x, y) coordinate system where “x” and “y” are distances east and north in meters, respectively. In addition, ISCST3 requires nearby building dimension data to calculate the impacts of building downwash.

For the purposes of modeling, a stack height beyond what is required by GEP is not allowed (40 CFR 52.21(h)). However, this requirement does not place a limit on the actual constructed height of a stack. GEP as used in modeling analyses is the maximum height allowed to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes that may be created by the source itself, nearby structures, or nearby terrain obstacles. In addition, the GEP modeling restriction assures that any required regulatory control measure is not compromised by the effect of that portion of the stack that exceeds the GEP. The guidance defines GEP stack height as 65 meters, or the formula stack height, whichever is higher. The EPA guidance (EPA, 1985) for determining the formula GEP stack height is as follows:

$$H_g = H + 1.5L$$

where:

H_g = GEP stack height, measured from the ground level elevation at the base of the stack

H = height of nearby structure(s) measured from the ground level elevation at the base of the stack

L = lesser dimension, height or projected width, of nearby structure(s).

In using this equation, the guidance document indicates that both the height and width of the structure are determined from the frontal area of the structure, projected onto a plane perpendicular to the direction of the wind.

For regulatory applications, a building is considered sufficiently close to a stack to cause wake effects when the distance between the stack and the nearest part of the building is less than or equal to five times the lesser of the height or the projected width of the building. The building dimensions were analyzed using software designed specifically for this purpose (BPIP Building Profile Input Program, Version 95086) to derive 36 wind-direction-specific building heights and building widths for use in downwash calculations. The building coordinates used to represent dimensions used in the GEP analysis are shown in Appendix H.7. This analysis results in a formula GEP height of 210 feet (64 meters) and a GEP stack height of 213 feet (65 meters) for the new gas turbines. The proposed gas turbine stack height of 150 feet does not exceed GEP stack heights.

5.2.4.3.2 <u>Screening Procedures and Impact Analysis</u>. To ensure that the impacts analyzed were for maximum emission levels and worst-case dispersion conditions, a screening procedure was used to determine the inputs to the impact modeling. The screening procedure analyzed the gas turbine operating conditions that would result in the maximum impacts, on a pollutant-specific basis. The operating conditions examined in this screening analysis, along with their exhaust and emission characteristics, are shown in Appendix H.8. These operating conditions represent a range of gas turbine loads (100% [both turbines], 75% [both turbines], and 45% [GE only]) at maximum and minimum anticipated operating temperatures (95° F/26.6% relative humidity (RH) and 41° F/100% RH).

The screening modeling was performed to select the worst-case turbine (Westinghouse 501F versus GE 7FA) from an air emissions and operating conditions standpoint. The proposed project is in the design phase and potential turbine vendors are currently being evaluated by the Applicant. Final turbine selection is not expected prior to submittal of the AFC. Therefore, the air quality modeling and Health Risk Assessment reflect the worst-case turbine and/or operating scenario and take into consideration that turbine emissions vary with load and ambient temperature.

As previously stated, the ISCST3 modeling was used in the screening modeling analysis. Technical options selected for the ISCST3 modeling are listed below. These are referred to as the regulatory default options in the ISCST3 User's Guide (EPA, 1995), except where the SCAQMD requires alternative options. The input options for ISCST3 are as follows:

- Final plume rise
- Buoyancy induced dispersion
- Stack tip downwash
- Urban dispersion coefficients (SCAQMD requirement)
- No calm processing routine (SCAQMD requirement)
- Default wind profile exponents (urban)
- Default vertical temperature gradients
- Anemometer height of 10 meters.

The ISCST3 model is a steady state model that can simulate the transport of emissions from point sources, area sources, volume sources and open pits. The ISCST3 model requires the input of various source and site specific data. The proposed turbine was modeled as a point source. Parameters required for modeling point sources include source location, stack base elevation, stack height, stack inner diameter, stack gas exit velocity, and stack gas exit temperature. Source parameters used in screening analyses for the GE and Westinghouse turbines were based on preliminary facility engineering data.

The modeling was performed assuming a stack diameter of 19 feet (5.79 meters) and a stack height of 150 feet (45.72 meters), which is below GEP height. Due to the proximity of structures and buildings, the potential for aerodynamic downwash effects were evaluated to assess if localized ambient air impacts would occur. Existing and proposed buildings and structures were incorporated into the modeling analysis.

The input of meteorological data is also required by the ISCST3 model. The required data include surface wind speed, surface wind direction, surface ambient temperature, stability class and mixing height data. As stated above, the 1981 data set for Burbank was used for this analysis. The Burbank Meteorological Station is located approximately 1 kilometer northeast of the MPP site.

Receptors are offsite locations or points where the model calculates pollutant concentrations. Receptors for the screening analysis were placed approximately every 25 meters along the property boundary at 25-meter increments to a distance of not less than 500 meters, at 100-meter increments to a distance of approximately 1 kilometer, and at 250-meter increments to a distance of 10 kilometers. UTM coordinates were used to identify receptor locations. Receptor elevations were obtained from electronic USGS map data Digital Elevation Models (DEMs).

Screening modeling was conducted to identify the combination of conditions that would result in maximum estimated air quality impacts. For each turbine (GE or Westinghouse), the screening modeling included conditions of 100 percent load (high load) and 75 percent load (average load) at temperatures of 95° F and 41° F. In addition, one duct burning scenario was added for the 95° F temperature at 100 percent load. Duct firing will not be used under cold ambient conditions. Therefore, no duct-firing at 41° F was included. Low load conditions (45% load) were also analyzed for the GE turbine. This condition is not guaranteed by Westinghouse, and therefore was not included in the modeling analysis. Impacts associated with annual (long-term) and 1-hour (short-term) averaging periods for NO_2, 1-hour and 8-hour averaging periods for CO, and 24-hour and annual averaging periods for PM_{10} were evaluated. The turbine scenario, or combination of turbine scenarios, with the highest overall offsite impacts ("worst case condition") under the range of operating conditions were subsequently used in the refined modeling analysis (except for the hourly scenario, which is based on start-up conditions).

Emissions from the operation of the cooling tower and the auxiliary boiler were not included in the screening analysis; however, they were part of the refined modeling analysis and the assessment of total project impacts.

Turbine emissions and stack gas flow rates exhibit variations based on ambient temperature and operating load. Emissions of NO_x, CO, and PM_{10} exhibit significant variation under different operating conditions. Emissions of SO_2 are expected to remain relatively constant over the range of turbine operating conditions expected at the site. Therefore, SO_2 was not included in the screening analysis to determine worst-case operating scenarios for 24-hour and annual average refined modeling.

In the screening modeling analysis, maximum impacts were predicted for two different turbine load levels at two different ambient temperatures (there was one additional load condition for the GE turbine). These loads and temperatures were chosen to represent different potential operating conditions to accommodate operational flexibility.

At low load, pollutant emission rates are lower, as are stack flow rates. This leads to lower plume rise and can result in higher impacts closer to the source before the plume has undergone much dispersion. Therefore, even though mass emission rates are lower, there is the potential for impacts to be higher at low load.

At lower ambient temperatures, the atmosphere is denser and a greater mass of air can flow through the turbines, resulting in higher mass emission rates and flow rates. Conversely, at higher ambient temperatures, the pollutant mass emission rates are lower than at lower temperatures, but again, so are the flow parameters; hence, the plume rise.

The worst-case condition is defined as the operating scenario of the worst-case turbine, which creates the highest overall pollutant concentrations under the proposed operating loads and ambient temperatures. Although annual average concentrations were calculated as part of this screening modeling analysis, the analysis is best used to determine scenarios for the refined short-term modeling. Average annual modeling should be based on the anticipated combination of operating conditions, including start-ups and shut-downs.

The screening analysis shows that the Westinghouse turbine alternative leads to the highest concentrations during non-startup conditions for all pollutants included in the screening analysis (CO, NO_2, and SO_2). Westinghouse stack parameters and emissions were subsequently used in the refined modeling analysis.

The Westinghouse turbine showed higher impacts for both 24-hour and annual concentrations of PM_{10} under duct burning operations. However, duct burning will only occur, at the most, for 12 hours during any 24-hour period, and for up to 1,000 hours annually. Under non-duct burning conditions, the GE turbine showed higher impacts. Impacts from both types of turbines (including duct burning and non duct burning) were included in the refined PM_{10} 24-hour and annual modeling analysis.

The specific modeling results of the screening procedure are presented in Appendix H.9. Table 5.2-37 summarizes the operating scenarios used in the refined modeling analysis.

TABLE 5.2-37

SCREENING SCENARIOS PRODUCING MAXIMUM MODELED AMBIENT CONCENTRATIONS

Pollutant	Average Period	Combustion Turbine Load with and without Duct Burning (percent)	Ambient Temperature (°F)
NO_x	1-hour (Westinghouse)	100 w/db[2]	95
	Annual (Westinghouse)	100 w/db	95
	Annual (Westinghouse)	100	41
SO_2	1-hour (Westinghouse)	100 w/db	95
	24-hour (Westinghouse)	100 w/db	95
	24-hour (Westinghouse)	100	41
	Annual (Westinghouse)	100 w/db	95
	Annual (Westinghouse)	100	95
CO	1-hour (Westinghouse)	100	95
	8-hour (Westinghouse)	100	95
PM_{10}[1]	24-hour (Westinghouse)	100 w/db	95
	24-hour (GE)	100	41
	Annual (Westinghouse)	100 w/db	95
	Annual (GE)	100	41

1 PM_{10} refined modeling was performed using emissions and stack parameters for both turbine vendors to determine maximum offsite concentrations.

2 w/db = with duct burning.

5.2.4.3.3 <u>Refined Air Quality Impact Analysis Approach</u>. Atmospheric dispersion modeling was performed to estimate ambient air quality concentrations and impacts, including background air pollutant concentrations. Additional specialized modeling was performed to estimate impacts during inversion break-up fumigation conditions, as well as potential short-term impacts during commissioning of the turbine. At the request of the CEC, the existing COB power generating facility boilers and peaking combustion turbine NO_2 emissions were also modeled.

As noted above, the screening modeling was used to assess the potential worst-case refined modeling scenarios. However, turbine start-up was used as the worst-case 1-hour average operating scenario since during start-up conditions emissions of CO and NO_2 are higher than under normal operating conditions. In addition, flow rates during start-up are lower resulting in decreased dispersion. Therefore, hourly ambient concentrations of CO and NO_2 were estimated assuming start-up operating conditions. GE gas turbine exhaust parameters for minimum operating load point (45%) were used to characterize turbine exhaust.

The 8-hour CO refined modeling scenario assumed a hot start-up for 1.5 hours and duct burning for the remaining 6.5 hours. Stack parameters were based on the Westinghouse turbine.

The 1-hour SO_2 refined modeling scenario was based on duct burning conditions and Westinghouse exhaust parameters. The 24-hour SO_2 refined modeling case was based on 12 hours of duct burning and 12 hours of non-ducting firing operations. The annual SO_2 scenario was based on 1,000 hours of duct burning, 52 hot starts, 52 warm starts, 104 shutdowns, and 7,083 hours of operation at full load with no duct burning.

The 24-hour and annual average PM_{10}, modeling scenarios included analysis of both GE and Westinghouse turbines, including duct burning and non-duct burning (100 % load) operations.

The NO_2 annual modeling scenario was based on 1,000 hours of duct burning, 52 hot starts, 52 warm starts, 104 shutdowns, and 7,083 hours of operation at full load with no duct burning.

A summary of project impacts is shown in Table 5.2-38. The table includes concentrations for operations of the proposed project sources (turbine, auxiliary boiler, and cooling tower). Concentration of NO_2 from the existing COB power generating facility sources in addition to the proposed sources are presented. Concentrations under fumigation conditions as well as commissioning are also summarized in the table.

The locations in UTM coordinates and the distance to maximum modeled concentrations from proposed sources are summarized in Table 5.2-39.

The modeling input assumptions for each pollutant and averaging period are shown in Appendix H.10. As discussed above, the CT stack parameters used in modeling the impacts for each pollutant and averaging period reflect the worst-case CT operating condition for that pollutant and averaging period identified in the screening analysis. Westinghouse exhaust parameters and the emission rates were used for all pollutants except PM_{10}, where both turbines were modeled for specific scenarios, as described above.

New Source Review (NSR) and Prevention of Significant Deterioration (PSD). To address impacts under the SCAQMD NSR regulations and PSD regulations, the impacts for the new emissions units were modeled. Although it is not necessary to include the auxiliary boiler and the cooling tower when addressing NSR impacts, the analysis was inclusive to show the insignificance of impacts under both NSR and PSD.

TABLE 5.2-38

SUMMARY OF RESULTS FROM REFINED MODELING ANALYSES MAXIMUM IMPACTS ($\mu g/m^3$)

		Refined Modeling		Specialized Modeling	
		Proposed Project (NSR/PSD)	**Existing COB Facility and MPP[1]**	**Fumigation[2]**	**Commissioning[3]**
NO_2	1-hour	19.97	381[5]	5.124	167
	Annual	0.27	1.9[5]	--	--
SO_2	1-hour	1.00	NA[6]	--	--
	3-hour	0.97	NA[6]	0.336	--
	24-hour	0.20	NA[6]	--	--
	Annual	0.021		--	--
CO	1-hour	247.51	NA[6]	63.49	174
	8-hour	30.65	NA[6]	--	85.1
PM_{10}	24-hour[4]	2.42	NA[6]	--	--
	Annual[4]	0.25	NA[6]	--	--

[1] Combustion turbine, duct burner, Olive Unit 4, and Magnolia Unit 5.
[2] Combustion turbine, duct burner.
[3] Combustion turbine, duct burner.
[4] GE turbine alternative resulted in higher predicted 24-hour and annual PM_{10} impacts than the Westinghouse alternative.
[5] Olive Boilers 1 and 2 and proposed turbine.
[6] Non-attainment pollutants not included in the facility-wide modeling analysis.
-- Dashed lines indicate that this parameter was not modeled.

TABLE 5.2-39

MAXIMUM MODELED CONCENTRATIONS

Pollutant	Maximum Concentration ($\mu g/m^3$)	Location UTM Coordinates X-east (m)	Location UTM Coordinates Y-north (m)	Distance from MPP (m)	Direction from MPP
NO_2					
1-hour average:	19.97	380150	3783360	1461	Northeast
Annual average:	0.27	382720	3782670	1248	East
SO_2					
1-hour average:	0.996	380480	3784410	2402	Northeast
3-hour average:	0.205	380480	3784440	2425	Northeast
24-hour average:	0.205	380530	3784460	2473	Northeast
Annual average:	0.0213	382840	3782700	1630	East
CO					
1-hour average:	247.51	380150	3783360	1461	Northeast
8-hour average:	29.34	380780	3783210	1974	East-Northeast
PM_{10}					
24-hour average:	2.42	380530	3784460	2473	Northeast
Annual average:	0.25	382720	3782670	1630	East

For the evaluation of ambient impacts under CEQA, future operation of the new combustion unit and cooling tower, plus the existing COB Olive and Magnolia units were modeled. Future emissions for the existing COB units were based on historical emissions data from July 1998 through June 2000.

The atmospheric dispersion modeling analysis was performed using the ISCPRIME model. The ISCPRIME model contains the same far-field dispersion algorithms as the ISCST3 model, but incorporates updated near-field downwash algorithms. The model is better suited to address facilities with multiple buildings where downwash can dominate plume dispersion. Unlike the ISCST3 model, the ISCPRIME model can also calculate pollutant concentrations in the cavity region. The cavity region is the area directly next to the building where pollutants can circulate, resulting in very high concentrations. The analysis was performed only for annual and maximum hourly concentrations of NO_2 consistent with the approved modeling protocol.

The annual average modeling included all existing sources (COB Olive Boilers 1 and 2, Olive Turbines 3 and 4, and Magnolia 5) based on operations July 1998 through July 2000, and the proposed turbine and auxiliary boiler. As previously noted, the existing Olive Units 1 and 2 are used for spinning reserve and have low utilization. In contrast, the operating profile of the existing Olive Units 3 and 4 and Magnolia 5 consists primarily of peaking operations. Therefore, two representative 1-hour operating scenarios for the existing sources were analyzed. The scenarios were based upon historical use and represent the worst-case, most likely operations. The operating scenarios analyzed for maximum 1-hour average concentrations for existing plus proposed sources are described below:

- **Scenario 1**: Olive Boiler Units 1 and 2 operating at 100 percent load conditions and the proposed MPP turbine operating under start-up conditions.

- **Scenario 2**: Olive Turbine Unit 4 and Magnolia Turbine Unit 5 operating at 100 percent load conditions and the proposed MPP turbine operating under start-up conditions.

Stack parameters and emission rates are summarized in Appendix H.12. The same coarse receptor grid used in the facility modeling analysis was used in the screening and refined "project only" modeling analysis. No fine receptor was necessary because maximum annual and hourly occurred at the facility fenceline where receptors were placed at 25-meter increments.

Maximum hourly NO_2 concentrations for Scenarios 1 and 2 were 381 $\mu g/m^3$ and 315 $\mu g/m^3$, respectively. These concentrations were found at the property boundary along Olive Street near the boiler structures. The maximum annual concentration of 1.9 $\mu g/m^3$ was found on the property line along Lake Street. Total facility impacts for both annual and hourly average concentrations were below the federal AAQS of 50 $\mu g/m^3$ and 470 $\mu g/m^3$, respectively.

Specialized Modeling Analyses.

- **Fumigation Modeling**: Fumigation occurs when a stable layer of air lies a short distance above the release point of a plume and unstable air lies below. Under these conditions, an exhaust plume may be drawn to the ground with little diffusion, causing high ground level pollutant concentrations. Although fumigation conditions rarely last as long as one hour, relatively high ground level concentrations may be reached during that time.

  The SCREEN3 model (Version 96043) was used to evaluate maximum ground level concentrations for short-term averaging periods (less than 24-hours). EPA guidance (EPA, 1992) was followed in evaluating fumigation impacts. Emission rates and stack parameters for the refined modeling analysis were used in the fumigation analysis.

  SCREEN3 model outputs for the inversion breakup fumigation impacts are shown in Appendix H.12.

- **Combustion Turbine Commissioning.** Combustion turbine commissioning is considered part of the construction phase of the project and is only expected to last seven weeks. An atmospheric dispersion modeling analysis was performed to simulate the transport of criteria pollutants during this phase of the project. The EPA-approved ISCST3 dispersion model was used to assess short-term, local impacts due to emissions during commissioning of the proposed CT. Because emissions from the cooling tower are expected to be minor in comparison to the CT and the auxiliary boiler is not expected to operate simultaneously with the CT during commissioning, the cooling tower and the auxiliary boiler were not included as part of this impact assessment.

  The activities occurring during commissioning will include, but are not limited to, initial tuning of the turbine prior to the installation of the SCR, steam testing during duct burning, and condenser bypass testing with no duct burning. These activities are expected to occur within the first month of commissioning. Subsequent activities may include tuning and optimization of the power train, a full load performance test, and CEM certification testing with duct burning, followed by full load rejection testing and full load run back (both with duct burning).

  Short-term emissions of CO, NO_x, PM_{10}, SO_2 and VOCs were quantified and are summarized in Appendix H.3. Emissions data for commissioning were provided by the turbine vendor, and include transient and steady-state operations.

  Atmospheric dispersion modeling was performed to estimate impacts from commissioning activities. Because the worst-case emissions from these operations occur prior to the installation of the CO catalyst and the SCR system (for NO_2 emissions reductions), the dispersion modeling was performed to include these pollutants. Emissions of PM_{10}, SO_2, and VOCs were not expected to be higher during commissioning than under normal operations, therefore they were not included in the dispersion modeling analysis. The highest 1-hour NO_x emission rate occurs during low load (20% load) operations, prior to the installation of the SCR. The maximum 1-hour NO_x emission rate is 192.14 lb/hr (24.21 g/s). Maximum CO emission rates occur during the first fire, assuming a 10 percent operating load. These emissions occur prior to installation of the CO catalyst. The maximum 1-hour CO emission rate is 200 lb/hr (25.20 g/s). The analysis included estimating maximum 1-hour concentrations of NO_2, and 1-hour and 8-hour concentrations of CO.

  The dispersion modeling parameters used in the analysis were based on the GE turbine operating at 45 percent load operating conditions. All other input assumptions were the same as those used in the refined modeling analysis. Emission rates and source parameters are summarized in Appendix H.3. Both coarse and fine receptor grids were used to identify the location of maximum concentrations.

- **Cumulative Modeling Analysis:** Under a traditional permitting schedule, the CEC requires that a protocol addressing cumulative impacts be developed. However, due the reduced permitting schedule for this project, the CEC has requested that the cumulative analysis be included as part of this permit application. The data necessary to perform the cumulative analyses have been requested from the SCAQMD but are currently not available. The cumulative analysis modeling protocol is included in Appendix H.6. The Applicant will prepare a cumulative modeling analysis according to the approved modeling protocol once the required data have been supplied by the SCAQMD.

5.2.4.3.4 Ambient Air Quality Results. To determine the maximum ground level impacts on ambient air quality for comparison to the applicable standards, modeled worst-case impacts were added to maximum observed background concentrations.

For background ambient pollutant concentrations for those pollutants that do not exceed the PSD monitoring exemption levels, Section 2.4 of the EPA guidelines (EPA, 1987) states that the existing monitoring data must be representative of the proposed facility impact area. The CARB monitors ambient NO_2, CO, SO_2, and PM_{10} concentrations at monitoring stations located in Burbank and Los Angeles. NO_2 and CO are also monitored at the Pasadena monitoring station.

The Burbank ambient air monitoring station is located less than ½ mile to the west of the project site. The Los Angeles monitoring station is located approximately 9 miles to the southeast of the project site, and the Pasadena monitoring station is located approximately 11 miles to the southeast of the project site. These monitoring stations are located in areas that are representative of the project site in terms of terrain and level of development. Consequently, concentrations monitored at these locations are expected to be similar to those at and around the project site. Table 5.2-40 presents the maximum concentrations of NO_x, SO_2, CO, and PM_{10} recorded for 1997 through 1999 from the Burbank, Los Angeles, and Pasadena ambient monitoring stations.

Maximum ground level impacts due to operation of the facility are shown together with the ambient air quality standards in Table 5.2-41. Despite the conservative (overpredictive) assumptions used throughout the analysis, the results indicate that the proposed MPP will not cause or contribute to violations of any state or federal air quality standards in attainment areas, and will not cause or contribute to further violations in non-attainment areas. For CO and PM_{10}, existing concentrations already exceed the state standards; however, as discussed further below, the proposed MPP will result in an impact that is below PSD significance levels. In addition, offsets will be provided for the net increase in CO and PM_{10} emissions from the project; this is also discussed further below.

TABLE 5.2-40

MAXIMUM BACKGROUND CONCENTRATIONS 1997-1999 ($\mu g/m^3$)

Pollutant	Averaging Time	1997	1998	1999
Burbank Monitoring Station				
NO_2	1-hour	376	269	337
	Annual	79	77	85
CO	1-hour	10,032	9,2734	10,488
	8-hour	8,276	8,356	10,180
SO_2	1-hour	91	26	23
	24-hour	13	18	8
	Annual	5	3	0
PM_{10}	24-hour	92	75	82
	AGM[1]	42	33	41
	AAM[2]	45	36	44
Los Angles Monitoring Station				
NO_2	1-hour	372	320	399
	Annual	81	73	73
CO	1-hour	10,146	9,348	8,208
	8-hour	8,892	7,045	7,262
SO_2	1-hour	52	235	138
	24-hour	29	16	26
	Annual	5	3	8
PM_{10}	24-hour	102	80	88
	AGM[1]	39	35	42
	AAM[2]	42	38	45
Pasadena Monitoring Station				
NO_2	1-hour	321	312	288
	Annual	64	66	70
CO	1-hour	9,234	9,962	7,557
	8-hour	6,829	7,214	7,534

[1] Annual Geometric Mean.
[2] Annual Arithmetic Mean.

TABLE 5.2-41

MODELED MAXIMUM PROJECT IMPACTS

Pollutant	Averaging Time	Maximum Project Impact[1] (μg/m³)	Background Concentrations (μg/m³)	Total Impact (μg/m³)	State Standard (μg/m³)	Federal Standard (μg/m³)
NO_2	1-hour	19.97	376	395.97	470	--
	Annual	0.27	85	85.27	--	100
CO	1-hour	247.51	10,488	10,735.51	23,000	40,000
	8-hour	30.65	10,180	10,210.65	10,000	10,000
SO_2	1-hour	1.00	91	92	655	--
	3-hour	0.97	–	0.97	–	--
	24-hour	0.20	18.33	18.53	105	365
	Annual	0.02	5.24	5.26	--	80
PM_{10}	24-hour	2.42	92	94.42	50	150
	Annual[2]	0.25	43	42.25	30	--
	Annual[3]	0.25	45	45.25	--	50

[1] Proposed facility including combustion turbine and duct burner.
[2] Annual Geometric Mean (State).
[3] Annual Arithmetic Mean (Federal).

<u>Applicability of PSD Requirements</u>.

As discussed in Section 7.0 (LORS), the PSD program requirements apply on a pollutant-specific basis to the following:

- A new major facility that will (1) emit 250 tpy or more; (2) become one of the 28 PSD source categories in the federal CAA; or (3) emit 100 tpy or more, or

- A major modification to an existing major facility that will result in net emissions increases in excess of the PSD significant emission thresholds.

The project area is classified as a federal non-attainment area for CO, PM_{10}, and ozone, thus the PSD regulations do not apply to these pollutants. The project is classified as attainment for SO_2 and NO_2, therefore PSD analysis may apply for these pollutants. The proposed project emits at levels below the new major source emission thresholds. The proposed facility is not a major modification based on the assumption that SCAPPA, as the project applicant, is not part of the existing COB power generating facility. To demonstrate project insignificance, NO_2 emissions as well as emissions of CO, PM_{10} and SO_2 have been included as part of the impact analysis.

Table 5.2-42 contains a comparison of the net emission increase with PSD significant emission levels.

TABLE 5.2-42

COMPARISON OF NET EMISSIONS INCREASE WITH PSD SIGNIFICANT EMISSIONS LEVELS (tpy)

	NOx	SO_2	CO	VOC	PM_{10}
New Equipment Emissions[1]	61.0	4.89	N/A[2]	N/A[2]	N/A[2]
PSD Significance Levels[3]	40	40	N/A[2]	N/A[2]	N/A[2]
PSD Review Required?	Yes	No	N/A[2]	N/A[2]	N/A[2]

1 Emissions from combustion turbine, duct burner, and auxiliary boiler.

2 Because the project area is classified as a federal non-attainment area for these pollutants, PSD does not apply for these pollutants.

3 Based on SCAQMD Rule 1702 as amended August 1999. The SCAQMD Rule 1702 (amended 1/6/89) contained PSD significance levels of 25 tpy. Although this rule was revised in August 1999 so that the significance levels in the rule match the values shown in the federal PSD regulation, the significance levels shown in the above table are from the 1/6/89 version of Rule 1702. The 1/6/89 version of Rule 1702 is enforceable until the EPA re-delegates the PSD program to the SCAQMD based on the revised rule.

PSD Significance. As shown in Table 5.2-43, project emissions show no significant impacts under PSD. The table summarizes maximum concentrations for CO, NO_2, PM_{10}, and SO_2 for averaging times corresponding to PSD significance levels. If project concentrations are below PSD significance levels, the project will not cause or contribute to a violation of the federal AAQS.

Impacts in Class I Areas. PSD regulations limit the degradation of air quality in areas designated Class I by imposing more stringent limits on air quality impacts from new sources and modifications. For purposes of full disclosure, an analysis of the project's impacts on Class I areas located within 100 km of the project site was performed. The only areas designated Class I within 100 km of the project are the Cucamonga Wilderness Area (59 km from the site) and San Gabriel Wilderness Area (29 km from the site). For each Class I area, receptors were placed along the boundary of the area nearest the project to evaluate the maximum-modeled impacts of the project on the area.

The results of the modeling analysis are compared with the Class I increments in Table 5.2-44. These results show that the modeled impacts of the MPP (CT, duct burner, auxiliary boiler and new cooling tower) in the nearby Class I areas are far below the PSD Class I increments and will not significantly degrade air quality.

TABLE 5.2-43

COMPARISON OF MAXIMUM MODELED IMPACTS TO PSD SIGNIFICANCE THRESHOLDS

Pollutant	Averaging Time	Maximum Modeled Impacts from ISCST3 μg/m^3	Federal PSD Significance Threshold μg/m^3	Federal PSD Class II Increment μg/m^3	Significant Under Federal PSD?
NO_2	1-Hour	19.97	---	25	No
	Annual	0.27	1.0	---	
SO_2	1-Hour	1.00	25	---	No
	3-Hour	0.97	---	512	No
	24-Hour	0.20	5	91	No
	Annual	0.021	1.0	20	
PM_{10}	24-Hour	2.42	5	30	No
	Annual	0.25	1.0	17	No
CO	1-Hour	247.51	2,000	---	No
	8-Hour	30.65	500	---	No

TABLE 5.2-44

PROJECT IMPACTS IN CLASS I AREAS

Pollutant	Averaging Period	Maximum Impact in Class I Area[1] (μg/m^3)	PSD Class I Increment (μg/m^3)
Cucamonga Wilderness Area			
NO_2	Annual	0.00081	2.5
SO_2	Annual	0.00006	2
	24 hours	0.0018	5
	3 hours	0.016	25
PM_{10}	Annual	0.00077	5
	24 hours	0.021	10
San Gabriel Wilderness Area			
NO_2	Annual	0.0023	2.5
SO_2	Annual	0.00019	2
	24 hours	0.0025	5
	3 hours	0.030	25
PM_{10}	Annual	0.0021	5
	24 hours	0.0356	10

[1] Impacts associated with combustion turbine, duct burner, and auxiliary boiler.

Applicability of NSR/RECLAIM Requirements. Because the installation of the new CT and duct burner is considered the installation of new equipment, compliance with NSR/RECLAIM requirements must be demonstrated. For the purposes of determining compliance with the requirements of the NSR and RECLAIM programs, the emissions from new equipment must not cause a significant increase in ambient non-attainment pollutant concentrations.

Assessment of Significance for NSR/RECLAIM. The maximum modeled CO, PM_{10}, and NO_2 impacts due to the CT only (including startup impacts), are compared with the NSR/RECLAIM significance levels in Table 5.2-45 below. It is not necessary to evaluate the modeling impacts from the auxiliary boiler because the emissions are below SCAQMD, Rule 1303, Appendix Table A-1 significance values. This comparison shows that ambient impacts for these pollutants from the project are not significant for NSR/RECLAIM.

TABLE 5.2-45

MAXIMUM MODELED IMPACTS AND NSR/RECLAIM SIGNIFICANCE THRESHOLDS (COMBUSTION TURBINE/DUCT BURNER ONLY)

Pollutant	Averaging Time	Maximum Modeled Impacts (μg/m^3)	NSR/RECLAIM Significance Threshold (μg/m^3)	Significant Under NSR/RECLAIM
CO (NSR Pollutant)	1-Hour	247.51	1,100	No
	8-Hour	30.65	500	No
PM_{10} (NSR Pollutant)	24-Hour	2.42	2.5	No
	Annual	0.25	1.0	No
NO_2 (RECLAIM Pollutant)	1-Hour	19.97	20.0	No
	Annual	0.27	1.0	No

Impacts from Specialized Modeling Analyses.

Fumigation Modeling Analysis Impacts. The effects of inversion break-up fumigation were estimated for short term impacts of CO, NO_2 and SO_2. Modeled concentrations were all below PSD and SCAQMD significance levels.

Combustion Turbine Commissioning Impacts. Atmospheric dispersion modeling was performed to estimate short-term concentrations from emissions of CO (1-hour and 8-hour average) and NO_x (1-hour average) during commissioning activities. The modeling analysis predicted a maximum 1-hour NO_2 ground level concentration of 166.87 μg/m^3 (located 1.4 kilometers to the northeast of the MPP site). The maximum 1-hour background NO_x concentration is 376 μg/m^3; thus the total concentration, including background, is 542.87 μg/m^3. Although this is above the state ambient air quality standard of 470 μg/m^3, commissioning activities are temporary in nature as the Applicant will be working to minimize commissioning time in order to reach a fully operational status. Given the short duration of the commissioning activities, it is highly unlikely that the worst-case modeled emissions and stack parameters would coincide with worst-case meteorological conditions. Thus, no significant adverse impacts are expected.

The maximum 1-hour and 8-hour CO concentrations were predicted to be 173.69 $\mu g/m^3$ and 85.14 $\mu g/m^3$, respectively. Both of these maximums were located to the northeast of the MPP site. The maximum 1-hour and 8-hour background concentrations of CO are 10,534 $\mu g/m^3$ and 10,225 $\mu g/m^3$, resulting in total ambient concentrations of 10,707.69 $\mu g/m^3$ and 10,310.14 $\mu g/m^3$, respectively. The total 1-hour CO concentration is below the federal standard of 40,000 $\mu g/m^3$. However, the total 8-hour concentration exceeds the federal standard of 10,000 $\mu g/m^3$. It should be noted that the area surrounding the MPP is considered non-attainment for the 8-hour CO standard. It should also be noted the modeled 8-hour average concentration (85 $\mu g/m^3$) is well below the PSD significance level of 500 $\mu g/m^3$. Therefore, commissioning emissions will not contribute to further exceedences of the national ambient air quality standard.

5.2.4.4 Health Risk Assessment

A Health Risk Assessment (HRA) was conducted to determine the expected impact of potentially toxic compound emissions. A detailed discussion of the HRA performed for the MPP is included in the Public Health Section (Section 5.16).

As shown in Section 5.16, the HRA results indicate that non-criteria pollutant impacts from the Project will be well below Rule 1401 significance thresholds. The results also indicate that no sensitive receptors will be adversely affected. The maximum cancer risk at a sensitive receptor was 0.37 in one million.

5.2.4.5 Air Quality Related Values

The PSD analysis addresses Air Quality Related Values (AQRVs) in two Class I areas within 100 kilometers of the proposed project location. Both the San Gabriel Mountain Wilderness Area (29 kilometers from the MPP) and Cucamonga Wilderness Area (59 kilometers from the MPP) are located within 100 kilometers of the site. The analyses described below were discussed and agreed upon by the U.S Forest Service (USFS), the Federal Land Manager (FLM) for the Class I areas mentioned above (McCorison, 2001.).

Guidance has been developed by the FLM's AQRV Workshop Group (FLAG) and has been summarized in a guidance document (FLAG, 2000). AQRVs include terrestrial and aquatic resources (water quality and biota) and are specific to each Class I area. AQRVs also include deposition and visibility-related values. Scientists at the USFS have identified AQRVs and defined limits of acceptable change (LAC) for sensitive receptors within each of the Class I wilderness areas. A determination of their relative susceptibility to air pollutant impacts and the quantity of pollutants which would exceed the LAC has been made. The effects of sulfur and nitrogen deposition, ozone exposure and particulates causing visibility impacts have also been defined. Specific AQRVs addressed in this section include deposition to estimate impacts on soils and vegetation, and visibility.

Soils and Vegetation.

In order to define AQRVs and to provide for effective impact assessment methods for AQRVs, the Forest Service held workshops in 1990 (USFS, 1992). The guidelines developed during this workshop have been used in preparing the assessments presented below.

The designated Wilderness Area contains vegetative ecosystems as identified by the FLM (USFS, 1992). These ecosystems are shown in Table 5.2-46. For each ecosystem, sensitive species or groups of species have been designated to represent potential impacts to each vegetation species in the ecosystem. The vegetation species of concern for the designated Wilderness Areas are also given in Table 5.2.46 (USFS, 1992). These species are impacted primarily by ozone but are also impacted by nitrogen and sulfur compounds. Sensitivity of several species is presented in Table 5.2-47 (USFS, 1992).

TABLE 5.2-46

VEGETATIVE ECOSYSTEMS AND SPECIES FOR NEARBY CLASS I WILDERNESS AREAS

Ecosystem	Sensitive Receptors
San Gabriel Wilderness	
Bigcone Douglas-fir	Lichens, Herbaceous Plants, Bigcone Douglas-fir
Chaparral	Huckleberry Oak
Oak Woodland	Lichens, Herbaceous Plants, California Black Oak
Cucamonga Wilderness	
Bigcone Douglas-fir	Lichens, Herbaceous Plants, Bigcone Douglas-fir
Chaparral	Huckleberry Oak
Mixed Conifer	Herbaceous Plants, Ponderosa Pine, Jeffery Pine, White Fir, Sugar Pine, Incense Pine, California Black Oak, Douglas Fir, W. White Pine, Santa Lucia Fir

TABLE 5.2-47

SENSITIVITY OF TREE SPECIES TO POLLUTION

	Sensitivity[1]		
Sensitive Receptor	**Ozone**	**Sulfur**	**Nitrogen**
Ponderosa Pine	H	H	H
Jeffrey Pine	H	H	H
White Pine	M	H	H
Incense Cedar	L	--	--
California Black Oak	M	--	--
Douglas Fir	M	H	H
Bigcone Douglas Fir	L	--	--
Western White Pine	L-M	--	--
Huckleberry Oak	L	--	--

[1] Ratings are given in USFS, 1992. Sensitivity to S and N are based primarily on experimental exposures to acidic fog, SO_2 and NO_2. Sensitivity ratings are: high (H), moderate (M), and low (L). Dashes indicate that there is insufficient information to rate sensitivity.

Exposure to ozone can produce several quantifiable effects, including visible injury (Miller et. al., 1989). Sensitivity to ozone and other stresses varies because of differences in uptake (Reich, 1987) and genetic factors (Karnofsky and Steiner, 1981). Four condition classes have been established with respect to ozone effects on trees, as presented in Table 5.2-48. The MPP will obtain emission offsets for ozone precursors in an amount sufficient to provide for a net air quality benefit. Therefore, the project would not have any adverse impact on ozone levels, and associated vegetation injury, in the San Gabriel and Cucamonga Wilderness Areas.

There are few data available on the effects of sulfur compounds on vegetation and there is a wide range of sensitivities to sulfur compounds (Davis and Wilhour, 1976). In order to protect sensitive species, the USFS (1992) recommends that short-term maximum levels should not exceed 40 to 50 parts per billion (ppb) and annual average concentrations should not exceed 8 to12 ppb (see Table 5.2-49). Given the very low level of sulfur dioxide emissions from the proposed project, there would not be an impact at either the San Rafael or the Cucamonga Wilderness Areas.

TABLE 5.2-48

CONDITION CLASSES FOR OZONE IMPACTS ON TREES

	Ozone Concentration 7-hour Growing Season Mean (ppb)	
Class	**Conifers**	**Hardwoods**
No injury	<60	<45
Very slight injury		45-70
Slight injury	61-70	71-90
Moderate injury	71-90	91-120
Severe injury	>90	>120

Source: USFS, 1992.

Few data are available on the effects of NO_2 on plant species in California (USFS, 1992). However, USFS (1992) recommends general guideline NO_2 condition classes; these are presented in Table 5.2-49.

TABLE 5.2-49

CONDITION CLASSES FOR NITROGEN DIOXIDE IMPACTS ON VEGETATION

Class	NO_2 Concentration 24-hour Annual Mean (ppb)
No injury	<15
Potential injury	15-50
Severe injury	>50

Source: USFS, 1992.

Lichens are also sensitive receptors for air pollutants. Lichens grow slowly and can live for centuries, and serve as an indicator of the cumulative effects of exposure to air pollution. Table 5.2-50 presents suggested sensitivity guidelines suggested by the USFS (1992). Given the very minor contribution from the proposed project, the project would not result in any significant impact.

TABLE 5.2-50

CONDITION CLASSES FOR LICHENS

	Sensitivity Class			
Pollutant	**Very Sensitive**	**Sensitive**	**Tolerant**	**Very Tolerant**
Ozone (ppb)[1]	≤20	21-40	41-70	>70
Sulfur (kg/ha/yr)	≤1.5	1.5-2.5	2.6-3.5	>3.5
Nitrogen (kg/ha/yr)	≤2.5	2.6-5.0	5.1-7.0	>7.0

[1] Ozone concentration is the 7-hour mean for May to October.

<u>Nitrate and Sulfate Deposition in Class I Areas</u>. To screen the above potential impacts, the maximum annual NO_2 and SO_2 concentrations along the boundaries of the San Gabriel and Cucamonga Wilderness Areas were calculated using the EPA-approved ISCST3 dispersion model. Receptors were placed at approximately 500-meter increments along the closest boundary. For modeling purposes, receptors were placed within 50 kilometers (between 47 and 50 kilometers) of the MPP for the Cucamonga Wilderness Area. The modeled 24-hour and annual concentrations of NO_2 and SO_2 were then converted to deposited nitrate and sulfate concentrations as described below.

Concentrations of NO_2 were converted to nitrate and expressed as HNO_3 by multiplying by the HNO_3-to-NO_2 molecular weight ratio (1.37) per Interagency Workgroup on Air Quality Modeling (IWAQM) guidelines (IWAQM, 1993). The maximum annual SO_2 concentration is assumed to deposit as SO_2 per IWAQM guidance. The calculated HNO_3 and SO_2 were then converted to potential annual deposition by multiplying by an assumed deposition velocity of 0.05 m/s, the number of seconds in a year (3.1536×10^7 seconds per year), and a factor of 2 to account for both wet and dry deposition. This gives deposition in units of $\mu g/m^2$, which is converted to kg/hectare (kg/ha) by multiplying by 10^{-5}. The estimated deposition rates for each Class I Wilderness Area are shown below.

The estimated 24-hour deposition rates for the Class I areas are shown in Appendix H.16.

<u>Cucamonga Wilderness Area</u>:

<u>Nitrate</u>

$$0.00081\ \mu g/m^3 \times 1.37 \times 2 \times 0.05\ m/s\ (3.1536 \times 10^7\ s/yr) \times 10^{-5}\ (kg/ha)/(\mu g/m^2)$$
$$= 0.035\ kg/ha\text{-}yr$$

Sulfate

$0.000060\ \mu g/m^3 \times 0.05\ m/s\ (3.1536 \times 10^7\ s/yr) \times 10^{-5}\ (kg/ha)/(\mu g/m^2)$
$= 0.00095$ kg/ha-yr

San Gabriel Wilderness Area:

Nitrate

$0.0023\ \mu g/m^3 \times 1.37 \times 2 \times 0.05\ m/s\ (3.1536 \times 10^7\ s/yr) \times 10^{-5}\ (kg/ha)/(\mu g/m^2)$
$= 0.099$ kg/ha-yr

Sulfate

$0.00019\ \mu g/m^3 \times 0.05\ m/s\ (3.1536 \times 10^7\ s/yr) \times 10^{-5}\ (kg/ha)/(\mu g/m^2)$
$= 0.0030$ hg/ha-yr

For Class I areas in California, the USFS has published an annual nitrogen deposition of less than 3 kg/ha-yr for shrubs and herbaceous plants as the “no injury level” (USFS 1992). It has also been determined that 20 kg/ha-yr of sulfur is the maximum long-term deposition that can be tolerated without impacts in most terrestrial ecosystems. Estimated deposition of both nitrogen and sulfur are well below these values.

Based on information presented by the USFS (1992), the San Gabriel and Cucamonga Wilderness areas have an AQRV associated with aquatic resources (streams and rivers only). NO_x and SO_2 emissions can affect aquatic resources through nitrogen and sulfur deposition. Acid neutralizing capacity (ANC), or alkalinity levels, can be used to measure a lake’s ability to absorb nitrogen and sulfur deposition and withstand acidification. Several factors influence ANC, such as bedrock geology, the degree of soil weathering, watershed size and hydraulic detention. The higher the ANC, the more resistant the water is to acidification. If nitrogen and sulfur deposition exceeds the ANC, or the buffering capacity of a lake, then the ANC is diminished, pH drops, and acidification may occur.

Another potential impact associated with nitrogen deposition is increased algae and plant growth due to the added nitrogen. In some cases, the increased growth leads to lake eutrophication, where introduced nitrogen acts as fertilizer and causes algae blooms. After dense algal mats cover a lake surface, subsurface algae die and cause oxygen deprivation during decay. The results are stressed aquatic resources and potential fish kills.

Since increased nitrogen and sulfur deposition due to the proposed power plant will be minimal, impacts to stream and river ANC and pH, and therefore acidification or eutrophication, are not likely to occur.

Visibility in Class I Areas. Depending on the distance between a project and Class I areas, two types of analyses may be required to evaluate potential visibility impacts on nearby Class I areas: (1) a regional haze analysis to determine the change in light extinction in the Class I areas; (2) a coherent plume impact analysis. For the proposed project, a regional haze analysis was performed. However, because nearby Class I areas are located over 50 kilometers from the project site, a coherent plume impact analysis was not performed for the project.

There are two Class I areas located in the project vicinity: the San Gabriel Wilderness Area (29 kilometers from the MPP) and the Cucamonga Wilderness (59 kilometers). The visibility analyses performed for these areas were based on FLAG guidance (2001) and on guidance from the FLM (McCorison, 2001). FLAG guidance states that any proposed major source located within 100 kilometers of a Class I Area must address visibility impacts. The guidance states that for Class I areas located within 50 kilometers of a proposed PSD source, the air quality analysis will address visibility using the VISCREEN model. For the purposes of addressing visibility impacts for Cucamonga Wilderness Area (59 kilometers away), the analysis will assume the site is no more than 50 kilometers from the proposed source location (McCorison, 2001).

A visibility screening analysis was conducted to assess the impact of the project's emissions on visibility at the two Class I Wilderness Areas listed above. The EPA program VISCREEN (Version 1.01) was used. The methodology, input parameters, and model predictions are discussed below.

Visual plume impacts were assessed with VISCREEN as recommended by the EPA *Workbook for Plume Visual Impact Screening and Analysis* (EPA, 1992). This analysis estimates the presence of a visible plume to a hypothetical observer who is located at the closest boundary of wilderness areas. For the purposes of this analysis, it was assumed that the observer at the Cucamonga Wilderness was 50 kilometers from the MPP (McCorison, 2001).

VISCREEN uses two scattering angles to calculate potential plume visual impacts for cases where the plume is likely to be brightest (10 degrees azimuth for the forward scatter case) and darkest (140 degrees azimuth for the backward scatter case). The forward scatter case yields very bright plumes because the sun is placed nearly directly in front of the observer, which would tend to maximize the light scattered by the plume. The backward scatter case yields the darkest possible plumes as the sun is placed directly behind the observer. For terrain viewing backgrounds, the terrain is assumed to be dark and located as close to the observer and the plume as possible. Scattering of green light is assumed (wavelength = 0.55 μm) since the eye is most sensitive to intensity changes in green. The observer is a hypothetical person at the boundary of each wilderness area located closest to the project.

The VISCREEN analysis provides two measures of potential plume impacts. The first measure is plume contrast, which is the relative difference in light intensity between light scattered from the plume and light scattered from the background. This is caused by the same phenomena as discussed in the regional haze analyses described above; that is, the relative difference in the light extinction coefficient between viewing light against background and against the plume.

VISCREEN also provides a second measure of plume perceptibility, the total color contrast (ΔE), since plume perceptibility is a function of both brightness and color. This supplements the first contrast measure with contrast calculated from an integrated function of light wavelengths for the three primary colors in the visible light spectrum: red, green, and blue. Green is used in the brightness component of the calculation; a ratio of red to green light is used for the color or "hue" that is reflected; and a ratio of green to blue light is used as the measure of the strength or density of the color (often called the "saturation").

The visibility analysis assumes the turbine is operating at 100-percent load with duct burning for 12 hours and at 100-percent load without duct burning for 12 hours. PM_{10} and NO_x emission rates under this operating condition are 1.89 g/s and 2.00 g/s, respectively. No specific stack parameters are required for model input.

A Level 2 visibility analysis was performed following methodologies outlined in the EPA *Workbook for Plume Visual Impact Screening and Analysis* (EPA, 1992). A Level 2 visibility analysis considers more realistic inputs representing the source and the specific wilderness area. These inputs could include representative particle size distribution for the plume and background, which differ from those used as screening defaults in a Level 1 analysis. Additional refinements can consider local topography and actual meteorological conditions either at the source or at the wilderness area. For the purposes of this analysis, one year of representative meteorological data collected in Burbank was analyzed. The most representative worst case meteorological condition was used as input to the VISCREEN model. The worst case meteorological condition is defined as "the sum of all frequencies of occurrence of conditions worse than this condition totals one percent (i.e., about four days per year)" (EPA, 1992). However, these conditions do not include wind speeds resulting in a travel time from the source to the Class II area of greater than 12 hours. The meteorological assessment following this guidance is presented in Appendix H-12. Tables 5.2-51 and 5.2-52 summarize inputs and results of the VISCREEN modeling. The VISCREEN analysis shows no adverse visibility impacts on either of the Class I areas analyzed.

TABLE 5.2-51

VISUAL IMPACT SCREENING ANALYSIS FOR THE SAN GABRIEL WILDERNESS AREA

Input Emissions			Particle Characteristics		
				Density	Diameter
Particulates	15.0	lb/hr	Primary Particle	2.5	6
NO_x (as NO_2)	15.87	lb/hr	Soot	2.0	1
Primary NO_2	0.00	lb/hr	Sulfate	1.5	4
Soot	0.00	lb/hr			
Primary SO_4	0.00	lb/hr			

Transport Scenario Specifications		
Background Ozone	0.04	ppm
Background Visual Range	246.0	Km
Source-Observer Distance	29.0	Km
Minimum Source-Class-I Distance	29.0	Km
Maximum Source-Class-I Distance	47	Km
Plume Source-Observer Angle	11.25	Degrees
Stability Factor	5	
Wind Speed	2.0	M/s

Maximum Visual Impacts Inside Class-I Area Screening Criteria Are Not Exceeded

					DE		Contrast	
Background	Theta	Azimuth	Distance	Alpha	Criteria	Plume	Criteria	Plume
Sky	10.0	152	47.0	17	2.00	1.047	0.05	0.022
Sky	140.0	152	47.0	17	2.00	0.205	0.05	-0.006
Terrain	10.0	84.0	29.0	84.0	2.00	1.850	0.05	0.011
Terrain	140.0	84.0	29.0	84.0	2.00	0.065	0.05	0.001

TABLE 5.2-52

VISUAL IMPACT SCREENING ANALYSIS FOR THE CUCAMONGA WILDERNESS AREA

Input Emissions			Particle Characteristics	Density	Diameter
Particulates	15.0	Lb/hr	Primary Particle	2.5	6
NO_x (as NO_2)	15.87	Lb/hr	Soot	2.0	1
Primary NO_2	0.00	Lb/hr	Sulfate	1.5	4
Soot	0.00	Lb/hr			
Primary SO_4	0.00	Lb/hr			

Transport Scenario Specifications

Background Ozone	0.04	ppm
Background Visual Range	246.0	Km
Source-Observer Distance	50	Km
Minimum Source-Class-I Distance	50	Km
Maximum Source-Class-I Distance	57	Km
Plume Source-Observer Angle	11.25	Degrees
Stability Factor	6	
Wind Speed	2.0	M/s

Maximum Visual Impacts Inside Class-I Area Screening Criteria Are Not Exceeded

					DE		Contrast	
Background	Theta	Azimuth	Distance	Alpha	Criteria	Plume	Criteria	Plume
Sky	10.0	118	57.00	51	2.00	.780	0.05	0.017
Sky	140.0	118	57.00	51	2.00	.171	0.05	-0.005
Terrain	10.0	84.0	50.00	84.0	2.00	1.879	0.05	0.014
Terrain	140.0	84.0	50.00	84.0	2.00	.080	0.05	0.001

<u>Nitrate and Sulfate Deposition in Class I Areas</u>. A major pathway by which air pollutants interact with ecosystems is through the soil. In most terrestrial ecosystems, soil is the principal repository for air contaminants of an anthropogenic origin. This can have an effect on vegetation, aquatic, and biological resources. Air pollutants may be transferred from the atmosphere to the ecosystem by a variety of mechanisms, including precipitation scavenging (wet deposition), dry deposition (including sedimentation and impaction), chemical reaction, and absorption (including plant uptake and assimilation). For this project, the pollutant of concern is NO_x, which reacts readily with soils and is usually converted to nitrate. A change in soil nitrate levels can cause numerous biochemical and physiological effects in plants, including inhibition of amino acid and protein formation, fatty acid and lipid production, carbon fixation (photosynthesis), and respiration (Smith, 1990). The possible adverse result is suppressed growth, and in extreme cases, vegetation may die.

NO_x emissions can also affect aquatic resources through nitrogen deposition. ANC, or alkalinity levels, can be used to measure a water body's ability to absorb nitrogen and withstand acidification. Several factors influence ANC, such as bedrock geology, the degree of soil weathering, watershed size and hydraulic detention. The higher the ANC, the more resistant the water is to acidification. If nitrogen deposition exceeds the ANC, or the buffering capacity, then the ANC is diminished, pH drops, and acidification may occur. Another potential impact associated with nitrogen deposition is increased algae and plant growth due to the added nitrogen. After dense algal mats cover the water surface, subsurface algae dies and leads to oxygen deprivation during decay. The results are stressed aquatic resources and potential fish kills.

<u>Coherent Plume Impact Analysis</u>. Pursuant to the requirements of SCAQMD Rules 1303 and 2005, the potential coherent plume visibility impacts from a project must be evaluated for Class I areas if the project is located within the distances prescribed in Rule 1303 and 2005. The Cucamonga Wilderness Area is located farther away than the trigger distance of 29 km. The distance to the San Gabriel Wilderness Area is the same as the trigger level. Although a visibility analysis is only required for the San Gabriel Wilderness Area under SCAQMD Rules 1303 and 2005, visibility analyses were performed for both Class I areas as part of the AQRV analysis (Section 5.2.4.5).

5.2.4.6 <u>Assessment of Significance for CEQA</u>

One commonly used measure of the significance of project ambient impacts is the PSD significance levels. The maximum modeled impacts from the combustion turbine/duct burner and auxiliary boiler are compared with these significance levels in Table 5.2-53. This comparison shows that the significance levels for air quality impacts are not exceeded for any pollutant at any location. Consequently, based on this criterion, the impacts for the project would not be considered significant.

TABLE 5.2-53

COMPARISON OF MAXIMUM MODELED IMPACTS FROM ISCST3, PSD SIGNIFICANCE THRESHOLDS AND CLASS II INCREMENTS (COMBUSTION TURBINE/DUCT BURNER & AUXILIARY BOILER)

Pollutant	Averaging Time	Maximum Modeled Impacts from ISCST3 $\mu g/m^3$	Federal PSD Significance Threshold $\mu g/m^3$	Federal PSD Class II Increment $\mu g/m^3$	Significant Under Federal PSD
NO_2	Annual	0.27	1.0	25	No
SO_2	3-Hour	0.97	25	512	No
	24-Hour	0.20	5	91	No
	Annual	0.021	1.0	20	No
PM_{10}	24-Hour	2.42	5	30	No
	Annual	0.25	1.0	17	No
CO	1-Hour	247.51	2,000	-	No
	8-Hour	30.65	500	-	No

A second common means for determining whether a project's impacts are considered significant under the CEQA is by comparing project emission levels with emissions based significance levels established by the SCAQMD. The SCAQMD's CEQA Air Quality Handbook includes emission-based significance levels. In Table 5.2-54, the expected net emission changes for the project are compared with these SCAQMD significance levels. This comparison shows that the SCAQMD significance levels are exceeded by the project for NO_x, CO, VOC, and PM_{10}.

TABLE 5.2-54

COMPARISON OF TOTAL FACILITY EMISSIONS WITH SCAQMD CEQA SIGNIFICANCE LEVELS (lbs/day)

	NO_x	SO_2	CO	VOC	PM_{10}
New Equipment Emissions[1]	396	31.1	1,045	273	360
SCAQMD Significance Levels	55	150	550	55	150
Significant according to SCAQMD levels?	Yes	No	Yes	Yes	Yes

[1] Includes emissions from combustion turbine, and duct burner, cooling tower and auxiliary boiler.

Consequently, based on this criterion, the impacts for the MPP would be considered significant for NO_x. As discussed in Section 5.2.4.2.7, mitigation will be provided for all emissions increases from the new equipment in the form of offsets, as required under SCAQMD regulations. Table 5.2-54 also shows that the SCAQMD significance levels are not exceeded by the project for CO, VOC, PM_{10}, or SO_2. Consequently, the impacts for the project would not be considered significant for these pollutants.

5.2.4.7 Abandonment/Closure

The abandonment/closure phase of the MPP may include demolition of structures, removal of pavement, and landscaping activities. The maximum air quality impacts associated with these activities are expected to be similar to the construction impacts discussed in Section 5.2.4.1.

5.2.4.8 Cumulative Impacts

To ensure that potential cumulative impacts of the project and other nearby projects are adequately considered, a cumulative impacts analysis will be conducted in accordance with the protocol included as Appendix H.6.

5.2.5 Mitigation Measures

Mitigation will be provided for all emissions increases from the project in the form of offsets and the installation of BACT, as required under SCAQMD regulations. If the cumulative air quality impacts analysis described in Appendix H.6 shows that the project will result in significant cumulative impacts, additional mitigation will be provided. Mitigation will be provided through the purchase of additional offsets from the SCAQMD emissions bank. Other proposed mitigation measures are presented below.

AQ-1: **Fugitive Dust Mitigation Plan**. Prior to breaking ground at the project site, the project owner will prepare a Construction Fugitive Dust Mitigation Plan specifically identifying fugitive dust mitigation measures to be employed for the construction of the MPP and related facilities.

Protocol: The Construction Fugitive Dust Mitigation Plan will specifically identify measures to limit fugitive dust emissions from construction of the project site and linear facilities. Measures that should be addressed include the following:

- The identification of the employee parking area(s) and surface of the parking area(s)
- The frequency for watering unpaved roads and disturbed areas.

AQ-2: **<u>Heavy Equipment Maintenance</u>.** The project owner will require as a condition of its construction contracts that all contractors/subcontractors ensure that all heavy earthmoving equipment, including, but not limited to bulldozers, backhoes, compactors, loaders, motor graders and trenchers, and cranes, dump trucks and other heavy duty construction related trucks, has been properly maintained and the engines tuned to the engine manufacturer's specifications. The project owner will further require as a condition of its construction contracts that this equipment shall employ high pressure fuel injection (common rail) system or engine timing retardation to control the emissions of oxides of nitrogen. The project owner will further require as a condition of its construction contracts that all heavy construction equipment, to the extent practical, shall remain running at idle for no more than five minutes.

AQ-3: **<u>Oxidizing Soot Filters</u>.** The project owner will install oxidizing soot filters on all suitable off-road construction equipment used on the power plant construction site. Where the oxidizing soot filter is determined to be unsuitable, the owner shall install and use an oxidation catalyst. Suitability is to be determined by an independent California Licensed Mechanical Engineer (CLME). Factors relevant to the suitability analysis shall include, but not be limited to, equipment size and operating time on location.

5.2.6 References

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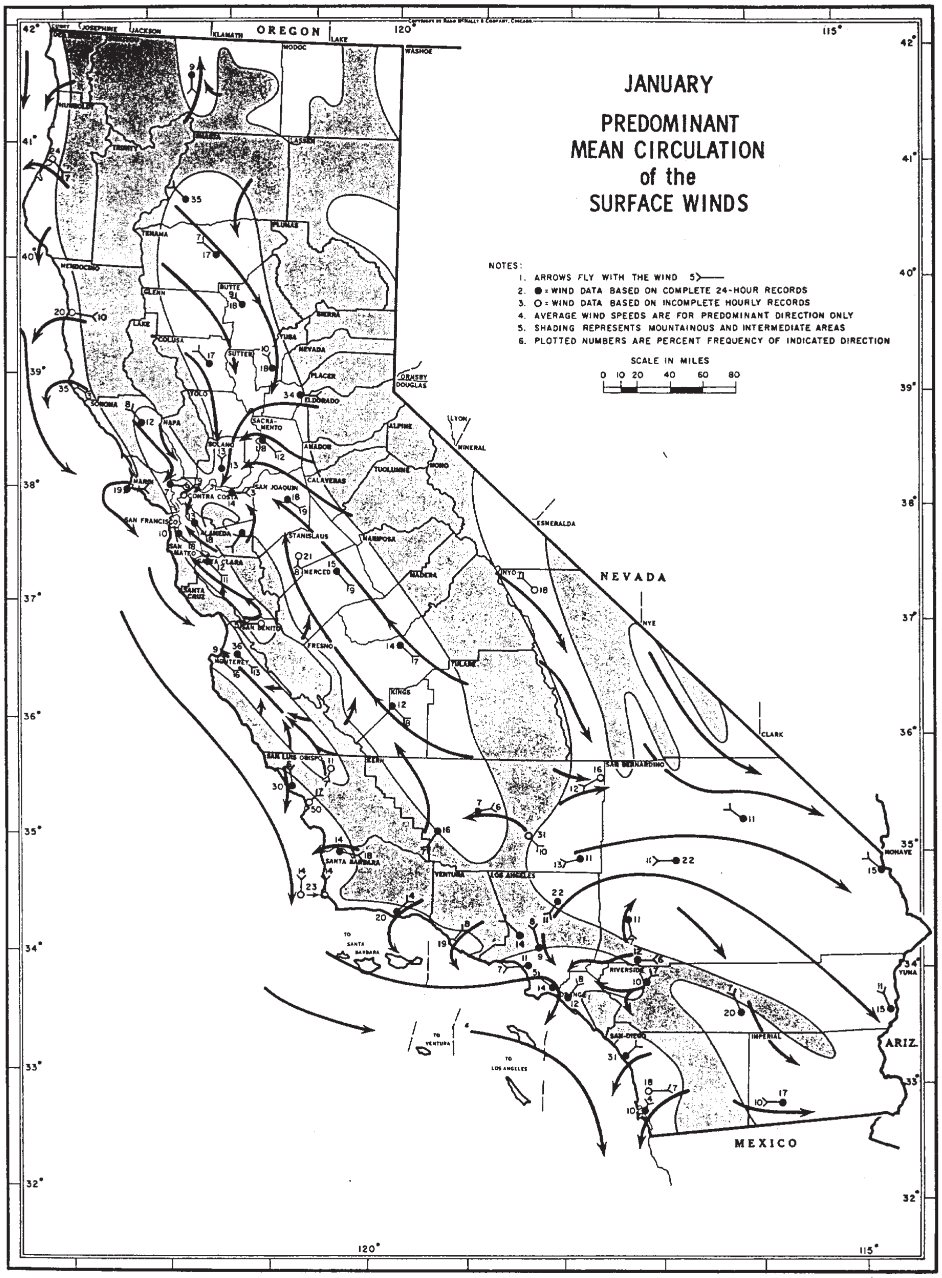

Magnolia Power Project	**Figure 5.2-1.** JANUARY PREDOMINANT MEAN CIRCULATION OF THE SURFACE WINDS	March 2001